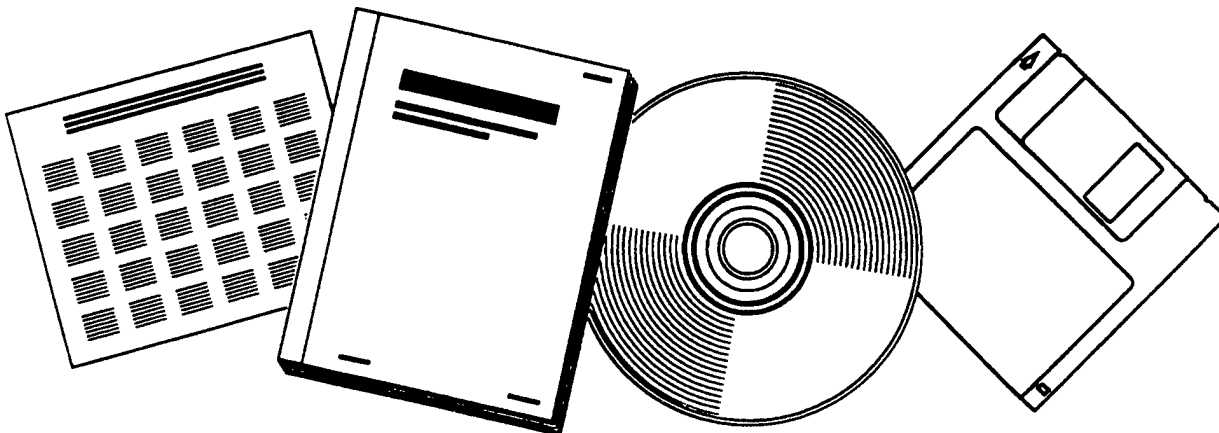**NTIS**

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PRESENT WORTH FACTORS FOR LIFE-CYCLE COST STUDIES IN THE DEPARTMENT OF DEFENSE (1994)

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GAITHERSBURG, MD

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U.S. DEPARTMENT OF COMMERCE
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Present Worth Factors for Life-Cycle Cost Studies in the Department of Defense (1994)

Data for DoD compliance with the Federal Methodology for Life-Cycle Cost Analysis, Title 10, CFR, Part 436, Subpart A, and OMB Circular A-94

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NIST

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Prepared for:
Office of the Assistant Secretary of Defense--
Production and Logistics
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Washington, DC 20301

October 1993

U.S. DEPARTMENT OF COMMERCE
Ronald H. Brown, Secretary

TECHNOLOGY ADMINISTRATION
Mary L. Good, Under Secretary for Technology

NATIONAL INSTITUTE OF STANDARDS
AND TECHNOLOGY
Arati Prabhakar, Director

PREFACE

On March 18, 1991, the Army, Navy, and Air Force signed a Memorandum of Agreement (MOA) on Criteria/Standards for Economic Analysis/Life-Cycle Costing for MILCON Design. The stated purpose of the MOA is to establish criteria and standards for performing economic analyses (EAs) and life-cycle cost (LCC) studies in support of design decisions for projects in the Military Construction (MILCON) Program; i.e., to support the selection from various alternatives of components/systems being considered as elements in facilities design. Since 1991 the criteria/standards package represented by the provisions of the MOA has been adopted and specified for use in conjunction with several other Department of Defense (DoD) applications. For example, the Office of the Secretary of Defense has specified that EAs conducted in support of project-justification decisions for ECIP (Energy Conservation Investment Program) projects be based on this same criteria/standards package.

The criteria and standards in the MOA are responsive to, and consistent with, the requirements of 10 CFR 436 governing the economic analysis of investments in energy conservation and renewable energy resources for Federal facilities. However, the governing order for non-energy-related investments, OMB Circular A-94, was significantly revised in October 1992. Circular A-94 no longer specifies a single discount rate for economic analysis of Federal investments. Instead, Circular A-94 specifies two basic types of discount rates: (1) a discount rate for cost-effectiveness, lease-purchase, and related analyses; and (2) a discount rate for public investment and regulatory analyses. Only discount rates for the first type of analyses are included in this NIST report, since its primary purpose is to support cost-effectiveness studies related to the design and operation of DoD facilities.

OMB discount rates for cost-effectiveness and lease-purchase studies are based on interest rates on Treasury Notes and Bonds with maturities ranging from 3 to 30 years. Currently (as of February 1993) five maturities have been specifically identified by OMB, and are shown here with the corresponding real interest rate to be used as the discount rate for studies subject to Circular A-94:

Maturity:	3-year	5-year	7-year	10-year	30-year
Rate:	3.1%	3.6%	4.0%	4.3%	4.5%

For total study periods corresponding to these five maturities, Circular A-94 requires that the discount rates correspond to the rates shown. The total study period is the time between the Beneficial Occupancy Date and the end of study (the service period), *plus* the time between the Date of Study and the Beneficial Occupancy Date (the planning and construction period). For total study periods different from the five maturities shown, Circular A-94 does not specify the discount rate to be used. Although Circular A-94 allows for interpolation between the rates shown, such an approach is not practical for the simplified tabular approach used in this document. Accordingly, the enclosed tables have been developed for use primarily for long-term studies, defined here as those with total study periods exceeding 10 years. These data are based on a discount rate of 4.5%, corresponding to OMB's 30-year rate.

The tables have also been designed for use in support of short-term studies, defined here as those with total study periods of 10 years or less. For these types of studies, the present worth factors are based on a discount rate of 4.0%, corresponding to OMB's 7-year rate. Accordingly, for short-term studies with total study periods not close to seven years, the discount factors provided in the tables should be considered approximations only. When more precise results are required, the present worth factors should be determined using a computer program specifically approved for DoD-construction design applications. The Life Cycle Cost in Design (LCCID) program, developed by the U.S. Army Corps of Engineers' Construction Engineering Research Laboratory (CERL) specifically for DoD-construction design applications, is recommended. The NIST Building Life Cycle Cost (BLCC) or DISCOUNT programs, developed for more general applications, are also acceptable. While the NIST programs produce accurate results, the formats of the reports provided do not correspond to the standard DoD report formats. Whichever computer program is used, it must be the most recent version of that program, which incorporates the latest DOE-projected energy price escalation rates and the discount rates for energy and non-energy studies.

The tables presented in this document are designed to be used in support of EAs/LCC studies conducted in accordance with the provisions of the MOA. These tables are considered to be valid and appropriate for all analyses/studies initiated during FY 94, and are authorized for use throughout that period. The present worth factors presented in the annually recurring cost tables are based on an assumed Date of Study (DOS) of April 1994. However, these factors should be sufficiently accurate for use at any time during that fiscal year.

The present worth factors in this report are consistent with those in NISTIR 85-3273-8, Energy Prices and Discount Factors for Life-Cycle Cost Analysis 1994, the Annual Supplement to NIST Handbook 135, Life-Cycle Costing Manual for the Federal Energy Management Program. However, the present worth factors for DoD studies are more specific as to the Date of Study and the Beneficial Occupancy Date than those in NISTIR 85-3273-8. The DoD factors for annually recurring costs assume that the Date of Study is April 1994 and that the Beneficial Occupancy Date occurs in October of the current year or in October of a future year (up to 2003). The DoD tables for annually recurring costs are based on a mid-year discounting convention for all annually-recurring costs, while the corresponding tables in NISTIR 85-3273-8 are based on an end-of-year discounting convention.

The same forecast of regional energy prices provided by the U.S. Department of Energy's Energy Information Administration (EIA) for NISTIR 85-3273-8 were used in computing the energy-type-specific tables in this report. However, with one exception, these tables are based on forecasts of energy prices for the industrial sector only, while the tables in NISTIR 85-3273-8 are based on residential, commercial, and industrial forecasts. Price forecasts for liquefied petroleum gas (LPG) in the residential sector were used for the DoD tables because industrial LPG price forecasts were not available from EIA.

For LCC analysis of Federal projects outside of the Department of Defense, especially those projects related to energy conservation and renewable energy resources, the present worth factors from NISTIR 85-3273-8 should be used.

Both the CERL LCCID Program and the NIST Building Life-Cycle Program (BLCC), version 4.0 or later, can be used for the economic evaluation of MILCON design projects, consistent with the MOA of March 18, 1991. Both use the DOE projections of energy price increases (which are on the LCCID and BLCC disks) to calculate the present value of future energy costs. In addition, the NIST ERATES program can be used to incorporate complex electricity rate schedules into an economic analysis of building energy use.

NISTIR 85-3273-8, as well as NIST Handbook 135, BLCC, and ERATES can be obtained from:

Advanced Sciences, Inc.
2000 North 15th Street
Suite 407
Arlington, VA 22201
(703) 243-4900

ABSTRACT

This document provides 47 tables of present worth factors to be used in computing the present worth of future costs (or cost reductions) in economic analyses of design decisions for projects in the DoD Military Construction Program. These factors are especially useful for the life-cycle cost analysis of investments in buildings or building systems which are intended to reduce future operating, maintenance, repair, replacement, and energy costs over the life of the facility. The tables include present worth factors for both one-time costs and annually recurring costs, based on the FEMP discount rate of 3.1% (FY 1994) for energy-related studies and on the OMB discount rate of 4.0% and 4.5% for short-term and long-term non-energy studies, respectively. Forecasts of future energy prices used in the calculation of present worth factors for energy costs were provided by the Energy Information Administration.

ACKNOWLEDGMENTS

CONTENTS

x

Part I. Tables of Present Worth Factors for Energy Studies

Part I contains tables of present worth factors for use in computing the life-cycle costs of the competing alternatives in an energy-related study, in accordance with the provisions of governing DoD criteria (see Appendix A). These tables are all numbered in a sequence beginning with the letter "E" for energy. The discount rate used to compute these present worth factors is 3.1%. This is the discount rate specified for use in energy-related projects by the Federal Energy Management Program for FY 1994.

Table E-1, "Present Worth Factors--One-Time Costs, Zero Differential Escalation," provides present worth factors for costs which occur one time or at irregular intervals throughout the study period. These costs include construction/acquisition costs, non-annually recurring maintenance costs, major repair and replacement costs, and retention/salvage value or disposal cost. These factors are called "single present worth" (SPW) factors. The present worth of each cost occurrence is found by multiplying that cost, in Date-of-Study (DOS) prices, by the SPW factor corresponding to the time of occurrence (years after DOS). Interpolation is encouraged for non-integer time periods.

Table E-2, "Present Worth Factors--Annually Recurring Non-Energy Costs, Zero Differential Escalation," provides present worth factors for all costs other than energy costs which are incurred annually throughout the study period in substantially the same amount each year (in constant dollar terms), such as routine maintenance and repair costs. These factors are called "uniform present worth" (UPW) factors. The factors in this table are based on the assumption that the DOS is in April 1994, the Beneficial Occupancy Date is in October of the same year or a future year, and that the annual cost occurs approximately at mid-year during each year of occupancy, or represents the sum of several costs distributed relatively uniformly throughout the year. The present worth of a cost recurring annually over the study period is found by multiplying the annual amount, in DOS prices, by the appropriate UPW factor. The number of payments generally corresponds to the number of years in the study period after the Beneficial Occupancy Date. Interpolation is encouraged for study periods and for beneficial occupancy dates other than those shown on the table.

Tables E-3-ET-R, where ET is the energy type code and R is the region number (R = 5 is for U.S. average), provide present worth factors for annually recurring energy costs. These factors are based on the assumption that annual energy usage/savings is constant from year to year, but that energy prices are changing over time, in accordance with the provisions of governing DoD criteria (see Appendix A). These factors are sometimes called "modified uniform present worth" (UPW*) factors. The UPW* factors in this table are based on the assumption that the DOS is in April 1994, the Beneficial Occupancy Date is in October of the same year or a future year, and that the annual energy cost occurs approximately at mid-year during each year of occupancy, or represents the sum of several costs distributed relatively uniformly throughout the year. The present worth of an annual energy cost over the study period is found by multiplying the annual amount, in DOS prices, by the appropriate UPW* factor. The number of payments generally corresponds to the number of years in the study period after the Beneficial Occupancy Date. Interpolation is encouraged for study periods and for Beneficial Occupancy Dates other than those shown on the tables.

Table E-1.   Present Worth Factors - One-Time Costs
Zero Differential Escalation   (e = 0%)

Time Cost Incurred (Years after DOS)	SPW Factor	Time Cost Incurred (Years after DOS)	SPW Factor
0.00	1.0000	16	0.6136
0.25	0.9924	17	0.5951
0.50	0.9849	18	0.5772
0.75	0.9774	19	0.5599
		20	0.5430
1	0.9699	21	0.5267
2	0.9408	22	0.5109
3	0.9125	23	0.4955
4	0.8850	24	0.4806
5	0.8584	25	0.4662
6	0.8326	26	0.4521
7	0.8076	27	0.4385
8	0.7833	28	0.4254
9	0.7598	29	0.4126
10	0.7369	30	0.4002
11	0.7148	35	0.3435
12	0.6933	40	0.2949
13	0.6724	45	0.2531
14	0.6522	50	0.2173
15	0.6326		

Notes: <1> Authorized Period of Use of Table is Oct 1993 through Sep 1994.
        <2> Tabulated Data Based on Criteria Contained in 18 Mar 91 Tri-Service Memorandum
            of Agreement on Criteria/Standards for EA/LCC for MILCON Design.
            Data Based on Discount Rate of 3.1% (NIST Annual Supplement to Handbook 135, Oct 1993).
        <3> Covers Costs such as Construction, Procurement, Replacement, Disposal.

Table E-2. Present Worth Factors--Annually Recurring Non-Energy Costs
Zero Differential Escalation (e = 0%)

Beneficial Occupancy Date

Number of Payments	Oct 1994	Oct 1995	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003
1	0.9699	0.9408	0.9125	0.8850	0.8584	0.8326	0.8076	0.7833	0.7598	0.7369
2	1.9107	1.8532	1.7975	1.7435	1.6911	1.6402	1.5909	1.5431	1.4967	1.4517
3	2.8232	2.7383	2.6560	2.5761	2.4986	2.4235	2.3506	2.2800	2.2114	2.1449
4	3.7082	3.5967	3.4886	3.3837	3.2819	3.1833	3.0876	2.9947	2.9047	2.8173
5	4.5667	4.4294	4.2962	4.1670	4.0417	3.9202	3.8023	3.6880	3.5771	3.4695
6	5.3993	5.2369	5.0795	4.9267	4.7786	4.6349	4.4956	4.3604	4.2293	4.1021
7	6.2069	6.0202	5.8392	5.6637	5.4934	5.3282	5.1680	5.0126	4.8619	4.7157
8	6.9902	6.7800	6.5761	6.3784	6.1866	6.0006	5.8202	5.6452	5.4754	5.3108
9	7.7499	7.5169	7.2909	7.0717	6.8590	6.6528	6.4528	6.2587	6.0706	5.8880
10	8.4868	8.2317	7.9841	7.7441	7.5112	7.2854	7.0663	6.8539	6.6478	6.4479
11	9.2016	8.9249	8.6566	8.3963	8.1438	7.8990	7.6614	7.4311	7.2076	6.9909
12	9.8948	9.5973	9.3088	9.0289	8.7574	8.4941	8.2387	7.9910	7.7507	7.5176
13	10.5673	10.2495	9.9413	9.6424	9.3525	9.0713	8.7985	8.5340	8.2774	8.0285
14	11.2195	10.8821	10.5549	10.2375	9.9297	9.6312	9.3416	9.0607	8.7883	8.5240
15	11.8520	11.4957	11.1500	10.8148	10.4896	10.1742	9.8683	9.5716	9.2838	9.0046
16	12.4656	12.0908	11.7273	11.3746	11.0326	10.7009	10.3791	10.0671	9.7644	9.4708
17	13.0607	12.6680	12.2871	11.9177	11.5593	11.2118	10.8747	10.5477	10.2305	9.9229
18	13.6380	13.2279	12.8302	12.4444	12.0702	11.7073	11.3553	11.0138	10.6827	10.3615
19	14.1978	13.7709	13.3569	12.9552	12.5657	12.1879	11.8214	11.4660	11.1212	10.7868
20	14.7409	14.2976	13.8677	13.4508	13.0463	12.6540	12.2736	11.9045	11.5466	11.1994
21	15.2676	14.8085	14.3632	13.9314	13.5125	13.1062	12.7121	12.3299	11.9592	11.5996
22	15.7784	15.3040	14.8438	14.3975	13.9646	13.5447	13.1375	12.7425	12.3593	11.9877
23	16.2739	15.7846	15.3100	14.8497	14.4032	13.9701	13.5500	13.1426	12.7475	12.3642
24	16.7545	16.2508	15.7621	15.2882	14.8285	14.3827	13.9502	13.5308	13.1239	12.7293
25	17.2207	16.7029	16.2007	15.7136	15.2411	14.7828	14.3383	13.9072	13.4891	13.0835
30	19.3495	18.7677	18.2034	17.6561	17.1252	16.6103	16.1108	15.6264	15.1565	14.7008
35	21.1769	20.5402	19.9226	19.3235	18.7425	18.1790	17.6324	17.1022	16.5880	16.0892
40	22.7456	22.0617	21.3984	20.7550	20.1309	19.5256	18.9385	18.3691	17.8168	17.2810
45	24.0923	23.3679	22.6652	21.9838	21.3227	20.6816	20.0598	19.4566	18.8716	18.3042
50	25.2483	24.4891	23.7528	23.0386	22.3459	21.6740	21.0223	20.3902	19.7771	19.1824

Notes: <1> Data Based on Assumed DOS of Apr 1994.
Authorized Period of Use of Table is Oct 1993 through Sep 1994.

<2> Tabulated Data Based on Criteria Contained in 18 Mar 91 Tri-Service Memorandum
of Agreement on Criteria/Standards for EA/LCC for MILCON Design.
Data Based on Discount Rate of 3.1% (NIST Annual Supplement to Handbook 135, Oct 1993).

<3> Covers Costs such as Routine Maintenance & Repair and Custodial.

Table E-3-EL-1. Present Worth Factors--Electricity

Number of Payments	Beneficial Occupancy Date									
	Oct 1994	Oct 1995	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003
1	0.9739	0.9449	0.9176	0.8949	0.8747	0.8587	0.8400	0.8159	0.7940	0.7724
2	1.9187	1.8624	1.8125	1.7696	1.7334	1.6987	1.6559	1.6099	1.5664	1.5236
3	2.8363	2.7574	2.6872	2.6284	2.5734	2.5146	2.4499	2.3823	2.3176	2.2552
4	3.7312	3.6321	3.5460	3.4683	3.3893	3.3086	3.2223	3.1335	3.0492	2.9675
5	4.6059	4.4908	4.3859	4.2843	4.1833	4.0810	3.9735	3.8651	3.7615	3.6613
6	5.4647	5.3308	5.2018	5.0782	4.9557	4.8322	4.7051	4.5774	4.4552	4.3371
7	6.3046	6.1467	5.9958	5.8507	5.7069	5.5638	5.4174	5.2712	5.1311	4.9996
8	7.1206	6.9407	6.7682	6.6018	6.4385	6.2761	6.1111	5.9470	5.7936	5.6488
9	7.9146	7.7131	7.5194	7.3334	7.1508	6.9699	6.7870	6.6095	6.4427	6.2805
10	8.6870	8.4643	8.2510	8.0458	7.8446	7.6457	7.4495	7.2587	7.0745	6.8954
11	9.4381	9.1959	8.9634	8.7395	8.5204	8.3082	8.0986	7.8904	7.6893	7.4939
12	10.1697	9.9082	9.6571	9.4153	9.1829	8.9574	8.7304	8.5053	8.2879	8.0766
13	10.8821	10.6020	10.3329	10.0779	9.8321	9.5891	9.3452	9.1038	8.8706	8.6437
14	11.5758	11.2778	10.9955	10.7270	10.4638	10.2040	9.9438	9.6865	9.4376	9.1955
15	12.2516	11.9403	11.6446	11.3588	11.0787	10.8025	10.5265	10.2536	9.9895	9.7327
16	12.9142	12.5895	12.2763	11.9736	11.6772	11.3852	11.0935	10.8054	10.5267	10.2557
17	13.5633	13.2212	12.8912	12.5722	12.2599	11.9523	11.6454	11.3427	11.0497	10.7646
18	14.1951	13.8361	13.4897	13.1548	12.8270	12.5041	12.1826	11.8656	11.5586	11.2598
19	14.8099	14.4346	14.0724	13.7219	13.3788	13.0414	12.7056	12.3745	12.0538	11.7419
20	15.4085	15.0173	14.6395	14.2738	13.9160	13.5643	13.2145	12.8697	12.5359	12.2111
21	15.9911	15.5844	15.1914	14.8110	14.4390	14.0732	13.7097	13.3518	13.0051	12.6679
22	16.5582	16.1362	15.7286	15.3339	14.9479	14.5684	14.1918	13.8210	13.4619	13.1125
23	17.1101	16.6734	16.2515	15.8428	15.4431	15.0505	14.6610	14.2778	13.9065	13.5451
24	17.6473	17.1964	16.7604	16.3381	15.9252	15.5197	15.1178	14.7224	14.3391	13.9662
25	18.1702	17.7053	17.2557	16.8201	16.3944	15.9765	15.5623	15.1550	14.7602	14.3760
30	20.5824	20.0532	19.5409	19.0444	18.5593	18.0835	17.6131	17.1510	16.7029	16.2669
35	22.6895	22.1039	21.5370	20.9872	20.4502	19.9240	19.4044	18.8945	18.3999	17.9186
40	24.5299	23.8952	23.2804	22.6841	22.1019	21.5316	20.9691	20.4174	19.8821	19.3613
45	26.1375	25.4599	24.8033	24.1664	23.5446	22.9357	22.3357	21.7476	21.1768	20.6214
50	27.5417	26.8266	26.1335	25.4611	24.8047	24.1622	23.5295	22.9095	22.3077	21.7221

Notes: <1> Data Based on Assumed DOS of Apr 1994.
Authorized Period of Use of Table is Oct 1993 through Sep 1994.

<2> Tabulated Data Based on Criteria Contained in 18 Mar 91 Tri-Service Memorandum
of Agreement on Criteria/Standards for EA/LCC for MILCON Design.
Data Based on Discount Rate of 3.1% and DOE Projections of Future Price Level Changes
for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1993).

<3> Region 1: ME, NH, VT, MA, CT, RI, NY, NJ, PA

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Table E-3-DO-1. Present Worth Factors—Distillate Oil

Number of Payments	Beneficial Occupancy Date									
	Oct 1994	Oct 1995	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003
1	0.9709	0.9462	0.9308	0.9207	0.9136	0.9100	0.9083	0.9057	0.9011	0.8896
2	1.9170	1.8770	1.8515	1.8342	1.8236	1.8183	1.8140	1.8069	1.7908	1.7635
3	2.8479	2.7977	2.7651	2.7443	2.7319	2.7240	2.7152	2.6965	2.6647	2.6224
4	3.7685	3.7112	3.6751	3.6525	3.6376	3.6252	3.6048	3.5704	3.5236	3.4690
5	4.6821	4.6213	4.5834	4.5583	4.5388	4.5148	4.4787	4.4293	4.3702	4.3058
6	5.5921	5.5295	5.4891	5.4594	5.4284	5.3887	5.3376	5.2759	5.2070	5.1333
7	6.5004	6.4353	6.3903	6.3491	6.3023	6.2476	6.1842	6.1127	6.0344	5.9505
8	7.4061	7.3364	7.2799	7.2229	7.1612	7.0942	7.0210	6.9402	6.8517	6.7530
9	8.3073	8.2261	8.1538	8.0818	8.0078	7.9310	7.8484	7.7574	7.6541	7.5363
10	9.1969	9.1000	9.0127	8.9285	8.8446	8.7585	8.6657	8.5599	8.4374	8.3008
11	10.0708	9.9589	9.8593	9.7653	9.6720	9.5757	9.4681	9.3432	9.2020	9.0471
12	10.9297	10.8055	10.6961	10.5927	10.4893	10.3782	10.2514	10.1077	9.9483	9.7755
13	11.7763	11.6423	11.5235	11.4100	11.2917	11.1615	11.0160	10.8540	10.6767	10.4869
14	12.6131	12.4697	12.3408	12.2124	12.0750	11.9260	11.7623	11.5824	11.3881	11.1812
15	13.4406	13.2870	13.1432	12.9957	12.8396	12.6723	12.4907	12.2938	12.0823	11.8587
16	14.2578	14.0894	13.9265	13.7603	13.5859	13.4007	13.2021	12.9881	12.7599	12.5204
17	15.0603	14.8727	14.6911	14.5065	14.3143	14.1121	13.8963	13.6656	13.4215	13.1661
18	15.8436	15.6373	15.4374	15.2349	15.0257	14.8064	14.5739	14.3273	14.0672	13.7961
19	16.6081	16.3836	16.1658	15.9463	15.7199	15.4839	15.2355	14.9730	14.6973	14.4113
20	17.3544	17.1119	16.8772	16.6406	16.3975	16.1456	15.8812	15.6030	15.3124	15.0119
21	18.0828	17.8233	17.5714	17.3182	17.0592	16.7913	16.5113	16.2182	15.9131	15.5983
22	18.7942	18.5176	18.2490	17.9798	17.7048	17.4213	17.1264	16.8188	16.4995	16.1705
23	19.4885	19.1952	18.9107	18.6255	18.3349	18.0365	17.7271	17.4052	17.0716	16.7287
24	20.1660	19.8568	19.5563	19.2555	18.9500	18.6371	18.3135	17.9774	17.6298	17.2736
25	20.8277	20.5025	20.1864	19.8707	19.5507	19.2235	18.8856	18.5356	18.1747	17.8055
30	23.9056	23.5069	23.1189	22.7330	22.3443	21.9499	21.5467	21.1331	20.7103	20.2804
35	26.6320	26.1680	25.7165	25.2685	24.8192	24.3657	23.9047	23.4348	22.9569	22.4733
40	29.0478	28.5260	28.0181	27.5151	27.0121	26.5061	25.9940	25.4741	24.9474	24.4163
45	31.1882	30.6152	30.0574	29.5057	28.9550	28.4026	27.8451	27.2810	26.7111	26.1378
50	33.0847	32.4664	31.8643	31.2694	30.6766	30.0830	29.4853	28.8819	28.2738	27.6631

Notes: <1> Data Based on Assumed DOS of Apr 1994.
Authorized Period of Use of Table is Oct 1993 through Sep 1994.
<2> Tabulated Data Based on Criteria Contained in 18 Mar 91 Tri-Service Memorandum
of Agreement on Criteria/Standards for EA/LCC for MILCON Design.
Data Based on Discount Rate of 3.1% and DOE Projections of Future Price Level Changes
for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1993).
<3> Region 1: ME, NH, VT, MA, CT, RI, NY, NJ, PA

Table E-3-RO-1. Present Worth Factors--Residual Oil

Number of Payments	Beneficial Occupancy Date									
	Oct 1994	Oct 1995	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003
1	0.9989	0.9897	0.9785	0.9741	0.9758	0.9831	0.9916	1.0000	1.0035	0.9954
2	1.9886	1.9682	1.9527	1.9500	1.9589	1.9747	1.9916	2.0035	1.9988	1.9766
3	2.9671	2.9423	2.9285	2.9331	2.9506	2.9747	2.9951	2.9988	2.9800	2.9457
4	3.9413	3.9182	3.9116	3.9247	3.9506	3.9782	3.9905	3.9800	3.9491	3.9057
5	4.9171	4.9013	4.9032	4.9247	4.9540	4.9736	4.9717	4.9491	4.9092	4.8594
6	5.9002	5.8929	5.9032	5.9282	5.9494	5.9548	5.9408	5.9092	5.8629	5.8084
7	6.8918	6.8929	6.9067	6.9235	6.9306	6.9239	6.9008	6.8629	6.8118	6.7529
8	7.8918	7.8964	7.9021	7.9047	7.8997	7.8839	7.8546	7.8118	7.7563	7.6915
9	8.8953	8.8918	8.8833	8.8738	8.8598	8.8377	8.8035	8.7563	8.6949	8.6209
10	9.8907	9.8729	9.8524	9.8339	9.8135	9.7866	9.7480	9.6949	9.6244	9.5409
11	10.8719	10.8420	10.8124	10.7876	10.7624	10.7311	10.6866	10.6244	10.5443	10.4511
12	11.8410	11.8021	11.7661	11.7365	11.7069	11.6697	11.6160	11.5443	11.4546	11.3522
13	12.8010	12.7558	12.7151	12.6810	12.6455	12.5991	12.5360	12.4546	12.3557	12.2447
14	13.7548	13.7047	13.6596	13.6196	13.5749	13.5191	13.4462	13.3557	13.2482	13.1275
15	14.7037	14.6492	14.5982	14.5491	14.4949	14.4293	14.3473	14.2482	14.1309	14.0011
16	15.6482	15.5878	15.5276	15.4690	15.4052	15.3304	15.2398	15.1309	15.0046	14.8660
17	16.5868	16.5173	16.4478	16.3793	16.3062	16.2229	16.1226	16.0046	15.8695	15.7220
18	17.5162	17.4372	17.3578	17.2804	17.1987	17.1057	16.9962	16.8695	16.7255	16.5695
19	18.4362	18.3475	18.2589	18.1728	18.0815	17.9793	17.8612	17.7255	17.5730	17.4090
20	19.3464	19.2486	19.1514	19.0556	18.9551	18.8443	18.7172	18.5730	18.4124	18.2400
21	20.2475	20.1411	20.0342	19.9293	19.8201	19.7003	19.5647	19.4124	19.2435	19.0624
22	21.1400	21.0238	20.9078	20.7942	20.6761	20.5478	20.4041	20.2435	20.0659	19.8766
23	22.0228	21.8975	21.7727	21.6502	21.5236	21.3872	21.2351	21.0659	20.8800	20.6822
24	22.8964	22.7624	22.6287	22.4977	22.3630	22.2182	22.0575	21.8800	21.6857	21.4798
25	23.7614	23.6184	23.4762	23.3371	23.1940	23.0406	22.8717	22.6857	22.4832	22.2694
30	27.9577	27.7729	27.5889	27.4079	27.2235	27.0293	26.8200	26.5945	26.3530	26.1004
35	31.9464	31.7213	31.4977	31.2777	31.0545	30.8221	30.5751	30.3122	30.0336	29.7445
40	35.7392	35.4763	35.2154	34.9583	34.6985	34.4299	34.1469	33.8484	33.5347	33.2107
45	39.3470	39.0482	38.7517	38.4594	38.1647	37.8615	37.5444	37.2121	36.8649	36.5077
50	42.7786	42.4457	42.1153	41.7896	41.4617	41.1258	40.7761	40.4117	40.0326	39.6438

Notes: <1> Data Based on Assumed DOS of Apr 1994.
Authorized Period of Use of Table is Oct 1993 through Sep 1994.

<2> Tabulated Data Based on Criteria Contained in 18 Mar 91 Tri-Service Memorandum
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Data Based on Discount Rate of 3.1% and DOE Projections of Future Price Level Changes
for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1993).

<3> Region 1: ME, NH, VT, MA, CT, RI, NY, NJ, PA

ENERGY STUDIES: REGION 1

Table E-3-NG-1. Present Worth Factors--Natural Gas

Number of Payments	Beneficial Occupancy Date									
	Oct 1994	Oct 1995	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003
1	0.9944	0.9841	0.9671	0.9573	0.9532	0.9533	0.9562	0.9608	0.9677	0.9717
2	1.9785	1.9512	1.9244	1.9106	1.9065	1.9095	1.9170	1.9285	1.9394	1.9382
3	2.9457	2.9085	2.8777	2.8638	2.8627	2.8702	2.8847	2.9002	2.9059	2.8900
4	3.9030	3.8618	3.8309	3.8200	3.8235	3.8379	3.8564	3.8666	3.8577	3.8255
5	4.8562	4.8150	4.7871	4.7808	4.7912	4.8097	4.8229	4.8184	4.7932	4.7471
6	5.8095	5.7712	5.7479	5.7485	5.7629	5.7761	5.7746	5.7539	5.7148	5.6476
7	6.7657	6.7320	6.7156	6.7202	6.7293	6.7279	6.7101	6.6756	6.6154	6.5232
8	7.7264	7.6997	7.6873	7.6867	7.6811	7.6634	7.6318	7.5761	7.4909	7.3867
9	8.6941	8.6714	8.6538	8.6384	8.6166	8.5851	8.5323	8.4517	8.3545	8.2469
10	9.6659	9.6379	9.6055	9.5740	9.5383	9.4856	9.4079	9.3152	9.2146	9.1031
11	10.6323	10.5897	10.5411	10.4956	10.4388	10.3611	10.2714	10.1754	10.0708	9.9548
12	11.5841	11.5252	11.4627	11.3961	11.3144	11.2247	11.1316	11.0316	10.9225	10.8027
13	12.5196	12.4468	12.3632	12.2717	12.1779	12.0848	11.9878	11.8833	11.7704	11.6469
14	13.4413	13.3474	13.2388	13.1352	13.0381	12.9410	12.8395	12.7312	12.6146	12.4789
15	14.3418	14.2229	14.1023	13.9954	13.8943	13.7928	13.6874	13.5754	13.4466	13.2914
16	15.2173	15.0864	14.9625	14.8516	14.7460	14.6407	14.5316	14.4073	14.2591	14.0848
17	16.0809	15.9466	15.8187	15.7033	15.5939	15.4848	15.3635	15.2198	15.0525	14.8590
18	16.9410	16.8028	16.6704	16.5512	16.4381	16.3168	16.1760	16.0132	15.8267	15.6145
19	17.7973	17.6545	17.5183	17.3954	17.2700	17.1293	16.9694	16.7875	16.5822	16.3522
20	18.6490	18.5024	18.3625	18.2274	18.0825	17.9227	17.7437	17.5430	17.3199	17.0725
21	19.4969	19.3466	19.1945	19.0398	18.8759	18.6970	18.4992	18.2807	18.0402	17.7757
22	20.3410	20.1786	20.0070	19.8333	19.6502	19.4525	19.2369	19.0009	18.7434	18.4618
23	21.1730	20.9911	20.8004	20.6075	20.4057	20.1901	19.9571	19.7041	19.4295	19.1311
24	21.9855	21.7845	21.5746	21.3630	21.1434	20.9104	20.6603	20.3902	20.0988	19.7845
25	22.7789	22.5587	22.3301	22.1007	21.8636	21.6136	21.3464	21.0596	20.7522	20.4224
30	26.4698	26.1615	25.8467	25.5330	25.2135	24.8829	24.5374	24.1744	23.7927	23.3902
35	29.7392	29.3525	28.9616	28.5735	28.1813	27.7798	27.3650	26.9344	26.4867	26.0197
40	32.6360	32.1800	31.7215	31.2675	30.8109	30.3465	29.8703	29.3798	28.8736	28.3496
45	35.2027	34.6853	34.1669	33.6544	33.1408	32.6206	32.0901	31.5465	30.9885	30.4140
50	37.4768	36.9051	36.3337	35.7693	35.2051	34.6356	34.0569	33.4663	32.8624	32.2430

Notes: <1> Data Based on Assumed DOS of Apr 1994.
Authorized Period of Use of Table is Oct 1993 through Sep 1994.
<2> Tabulated Data Based on Criteria Contained in 18 Mar 91 Tri-Service Memorandum
of Agreement on Criteria/Standards for EA/LCC for MILCON Design.
Data Based on Discount Rate of 3.1% and DOE Projections of Future Price Level Changes
for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1993).
<3> Region 1: ME, NH, VT, MA, CT, RI, NY, NJ, PA

Table E-3-SC-1. Present Worth Factors--Steam Coal

Number of Payments	Beneficial Occupancy Date									
	Oct 1994	Oct 1995	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003
1	0.9822	0.9675	0.9529	0.9355	0.9209	0.9142	0.9047	0.8874	0.8727	0.8582
2	1.9498	1.9204	1.8884	1.8564	1.8351	1.8189	1.7921	1.7602	1.7309	1.7018
3	2.9027	2.8559	2.8093	2.7706	2.7398	2.7064	2.6649	2.6183	2.5746	2.5355
4	3.8381	3.7768	3.7235	3.6753	3.6272	3.5791	3.5230	3.4620	3.4082	3.3590
5	4.7590	4.6910	4.6282	4.5627	4.5000	4.4373	4.3667	4.2956	4.2317	4.1721
6	5.6732	5.5957	5.5156	5.4355	5.3582	5.2809	5.2003	5.1191	5.0449	4.9788
7	6.5780	6.4832	6.3884	6.2936	6.2018	6.1146	6.0238	5.9323	5.8516	5.7807
8	7.4654	7.3559	7.2465	7.1373	7.0355	6.9381	6.8370	6.7390	6.6534	6.5717
9	8.3381	8.2141	8.0902	7.9709	7.8590	7.7512	7.6437	7.5409	7.4444	7.3480
10	9.1963	9.0577	8.9238	8.7944	8.6721	8.5579	8.4456	8.3318	8.2207	8.1116
11	10.0400	9.8914	9.7473	9.6076	9.4788	9.3598	9.2365	9.1082	8.9844	8.8626
12	10.8736	10.7149	10.5605	10.4143	10.2807	10.1508	10.0129	9.8718	9.7353	9.6010
13	11.6971	11.5280	11.3672	11.2161	11.0717	10.9271	10.7765	10.6227	10.4737	10.3269
14	12.5102	12.3347	12.1691	12.0071	11.8480	11.6907	11.5274	11.3611	11.1996	11.0419
15	13.3169	13.1366	12.9600	12.7835	12.6116	12.4417	12.2658	12.0870	11.9146	11.7461
16	14.1188	13.9276	13.7364	13.5471	13.3626	13.1801	12.9917	12.8020	12.6188	12.4379
17	14.9098	14.7039	14.5000	14.2980	14.1010	13.9059	13.7067	13.5062	13.3107	13.1176
18	15.6861	15.4675	15.2509	15.0364	14.8268	14.6210	14.4109	14.1981	13.9903	13.7851
19	16.4497	16.2185	15.9893	15.7623	15.5419	15.3252	15.1028	14.8777	14.6578	14.4420
20	17.2007	16.9569	16.7152	16.4773	16.2460	16.0170	15.7824	15.5453	15.3147	15.0883
21	17.9391	17.6828	17.4302	17.1815	16.9379	16.6967	16.4500	16.2021	15.9610	15.7240
22	18.6650	18.3978	18.1344	17.8734	17.6176	17.3642	17.1068	16.8484	16.5967	16.3491
23	19.3800	19.1020	18.8263	18.5530	18.2851	18.0211	17.7531	17.4841	17.2219	16.9639
24	20.0842	19.7938	19.5059	19.2206	18.9420	18.6673	18.3888	18.1093	17.8366	17.5682
25	20.7760	20.4735	20.1735	19.8774	19.5882	19.3030	19.0140	18.7240	18.4409	18.1622
30	24.0621	23.7050	23.3522	23.0037	22.6622	22.3251	21.9844	21.6433	21.3096	20.9810
35	27.0841	26.6755	26.2715	25.8723	25.4810	25.0947	24.7058	24.3172	23.9369	23.5625
40	29.8537	29.3968	28.9454	28.4996	28.0625	27.6312	27.1980	26.7660	26.3430	25.9266
45	32.3902	31.8890	31.3942	30.9057	30.4266	29.9541	29.4804	29.0086	28.5465	28.0917
50	34.7131	34.1715	33.6368	33.1092	32.5917	32.0814	31.5707	31.0624	30.5645	30.0745

Notes: <1> Data Based on Assumed DOS of Apr 1994.
             Authorized Period of Use of Table is Oct 1993 through Sep 1994.
        <2> Tabulated Data Based on Criteria Contained in 18 Mar 91 Tri-Service Memorandum
             of Agreement on Criteria/Standards for EA/LCC for MILCON Design.
             Data Based on Discount Rate of 3.1% and DOE Projections of Future Price Level Changes
             for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1993).
        <3> Region 1: ME, NH, VT, MA, CT, RI, NY, NJ, PA

Table E-3-LP-1. Present Worth Factors--Liquefied Petroleum Gas (LPG)

Number of Payments						Beneficial Occupancy Date					
	Oct 1994	Oct 1995	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003
1	0.9586	0.9267	0.9053	0.8872	0.8723	0.8596	0.8472	0.8351	0.8226	0.8065
2	1.8853	1.8320	1.7925	1.7596	1.7320	1.7068	1.6823	1.6577	1.6291	1.5949
3	2.7906	2.7192	2.6649	2.6192	2.5792	2.5419	2.5049	2.4642	2.4175	2.3663
4	3.6779	3.5916	3.5245	3.4664	3.4142	3.3645	3.3113	3.2526	3.1889	3.1220
5	4.5502	4.4512	4.3717	4.3015	4.2368	4.1710	4.0998	4.0240	3.9447	3.8637
6	5.4098	5.2984	5.2067	5.1241	5.0433	4.9594	4.8712	4.7797	4.6863	4.5918
7	6.2570	6.1334	6.0294	5.9305	5.8318	5.7308	5.6269	5.5214	5.4144	5.3064
8	7.0921	6.9561	6.8358	6.7190	6.6031	6.4865	6.3686	6.2495	6.1290	6.0047
9	7.9147	7.7625	7.6243	7.4904	7.3589	7.2282	7.0967	6.9641	6.8273	6.6842
10	8.7212	8.5510	8.3957	8.2461	8.1006	7.9563	7.8113	7.6624	7.5068	7.3455
11	9.5096	9.3224	9.1514	8.9878	8.8286	8.6709	8.5096	8.3419	8.1682	7.9891
12	10.2810	10.0781	9.8931	9.7159	9.5432	9.3692	9.1891	9.0032	8.8117	8.6152
13	11.0367	10.8198	10.6212	10.4305	10.2415	10.0487	9.8504	9.6467	9.4378	9.2246
14	11.7784	11.5478	11.3357	11.1288	10.9210	10.7100	10.4939	10.2729	10.0473	9.8176
15	12.5065	12.2624	12.0341	11.8083	11.5824	11.3536	11.1201	10.8823	10.6402	10.3946
16	13.2211	12.9608	12.7135	12.4696	12.2259	11.9797	11.7295	11.4753	11.2172	10.9561
17	13.9194	13.6402	13.3749	13.1131	12.8520	12.5891	12.3225	12.0522	11.7787	11.5024
18	14.5989	14.3016	14.0184	13.7393	13.4615	13.1821	12.8994	12.6138	12.3250	12.0340
19	15.2602	14.9451	14.6446	14.3487	14.0545	13.7590	13.4610	13.1601	12.8566	12.5513
20	15.9038	15.5713	15.2540	14.9417	14.6314	14.3206	14.0073	13.6917	13.3739	13.0548
21	16.5299	16.1807	15.8470	15.5186	15.1929	14.8669	14.5389	14.2090	13.8774	13.5448
22	17.1393	16.7737	16.4239	16.0802	15.7393	15.3985	15.0562	14.7125	14.3674	14.0216
23	17.7323	17.3506	16.9854	16.6265	16.2708	15.9158	15.5597	15.2025	14.8442	14.4854
24	18.3092	17.9121	17.5318	17.1581	16.7881	16.4193	16.0497	15.6793	15.3080	14.9368
25	18.8708	18.4585	18.0633	17.6754	17.2916	16.9093	16.5265	16.1431	15.7594	15.3761
30	21.4595	20.9776	20.5148	20.0609	19.6129	19.1681	18.7245	18.2822	17.8411	17.4020
35	23.7183	23.1757	22.6539	22.1426	21.6388	21.1396	20.6431	20.1494	19.6582	19.1703
40	25.6898	25.0943	24.5210	23.9597	23.4071	22.8605	22.3179	21.7792	21.2443	20.7138
45	27.4107	26.7691	26.1508	25.5458	24.9507	24.3626	23.7797	23.2018	22.6287	22.0611
50	28.9128	28.2309	27.5734	26.9302	26.2980	25.6738	25.0557	24.4435	23.8372	23.2371

Notes: <1> Data Based on Assumed DOS of Apr 1994.
　　　　　Authorized Period of Use of Table is Oct 1993 through Sep 1994.
　　　<2> Tabulated Data Based on Criteria Contained in 18 Mar 91 Tri-Service Memorandum
　　　　　of Agreement on Criteria/Standards for EA/LCC for MILCON Design.
　　　　　Data Based on Discount Rate of 3.1% and DOE Projections of Future Price Level Changes
　　　　　for Residential Sector (NIST Annual Supplement to Handbook 135, Oct 1993).
　　　<3> Region 1: ME, NH, VT, MA, CT, RI, NY, NJ, PA

Table E-3-EL-2. Present Worth Factors--Electricity

Number of Payments	Beneficial Occupancy Date									
	Oct 1994	Oct 1995	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003
1	0.9671	0.9362	0.9015	0.8726	0.8503	0.8315	0.8102	0.7861	0.7662	0.7499
2	1.9033	1.8376	1.7741	1.7230	1.6819	1.6418	1.5964	1.5523	1.5161	1.4812
3	2.8047	2.7103	2.6244	2.5545	2.4921	2.4279	2.3626	2.3022	2.2474	2.1921
4	3.6774	3.5606	3.4560	3.3647	3.2782	3.1941	3.1125	3.0336	2.9583	2.8830
5	4.5277	4.3921	4.2662	4.1509	4.0444	3.9440	3.8438	3.7445	3.6492	3.5546
6	5.3592	5.2024	5.0523	4.9171	4.7943	4.6753	4.5547	4.4353	4.3208	4.2053
7	6.1695	5.9885	5.8185	5.6670	5.5256	5.3862	5.2456	5.1069	4.9715	4.8359
8	6.9556	6.7547	6.5684	6.3983	6.2366	6.0771	5.9171	5.7577	5.6021	5.4497
9	7.7218	7.5046	7.2997	7.1092	6.9274	6.7487	6.5679	6.3883	6.2159	6.0471
10	8.4717	8.2359	8.0107	7.8001	7.5990	7.3994	7.1985	7.0020	6.8133	6.6285
11	9.2030	8.9468	8.7015	8.4716	8.2498	8.0300	7.8123	7.5994	7.3947	7.1944
12	9.9139	9.6377	9.3731	9.1224	8.8803	8.6438	8.4097	8.1809	7.9606	7.7452
13	10.6048	10.3093	10.0239	9.7530	9.4941	9.2412	8.9911	8.7468	8.5114	8.2813
14	11.2764	10.9600	10.6545	10.3668	10.0915	9.8226	9.5570	9.2975	9.0475	8.8030
15	11.9271	11.5906	11.2682	10.9641	10.6729	10.3885	10.1078	9.8336	9.5692	9.3109
16	12.5577	12.2044	11.8656	11.5456	11.2388	10.9393	10.6438	10.3553	10.0771	9.8052
17	13.1715	12.8018	12.4470	12.1115	11.7896	11.4754	11.1655	10.8632	10.5714	10.2863
18	13.7689	13.3832	13.0130	12.6623	12.3257	11.9971	11.6734	11.3575	11.0525	10.7546
19	14.3503	13.9491	13.5637	13.1983	12.8474	12.5050	12.1678	11.8386	11.5208	11.2104
20	14.9162	14.4999	14.0998	13.7200	13.3553	12.9993	12.6488	12.3069	11.9766	11.6539
21	15.4670	15.0360	14.6215	14.2279	13.8496	13.4804	13.1171	12.7627	12.4201	12.0857
22	16.0030	15.5577	15.1294	14.7222	14.3307	13.9487	13.5729	13.2062	12.8519	12.5060
23	16.5248	16.0656	15.6237	15.2033	14.7990	14.4045	14.0165	13.6380	13.2722	12.9151
24	17.0327	16.5599	16.1048	15.6716	15.2548	14.8480	14.4482	14.0583	13.6813	13.3133
25	17.5270	17.0410	16.5731	16.1274	15.6983	15.2798	14.8686	14.4675	14.0795	13.7008
30	19.8075	19.2607	18.7337	18.2304	17.7452	17.2720	16.8076	16.3547	15.9164	15.4888
35	21.7997	21.1997	20.6209	20.0673	19.5332	19.0125	18.5018	18.0038	17.5216	17.0513
40	23.5402	22.8939	22.2700	21.6725	21.0957	20.5334	19.9822	19.4449	18.9244	18.4167
45	25.0611	24.3743	23.7111	23.0752	22.4611	21.8625	21.2759	20.7041	20.1501	19.6099
50	26.3902	25.6680	24.9703	24.3010	23.6543	23.0239	22.4064	21.8046	21.2213	20.6525

Notes: <1> Data Based on Assumed DOS of Apr 1994.
        Authorized Period of Use of Table is Oct 1993 through Sep 1994.
        <2> Tabulated Data Based on Criteria Contained in 18 Mar 91 Tri-Service Memorandum
        of Agreement on Criteria/Standards for EA/LCC for MILCON Design.
        Data Based on Discount Rate of 3.1% and DOE Projections of Future Price Level Changes
        for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1993).
        <3> Region 2: OH, IN, IL, MI, WI, MN, IA, MO, ND, SD, NE, KS

Table E-3-DO-2. Present Worth Factors--Distillate Oil

Number of Payments	Beneficial Occupancy Date									
	Oct 1994	Oct 1995	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003
1	0.9709	0.9473	0.9315	0.9210	0.9155	0.9135	0.9118	0.9100	0.9061	0.8942
2	1.9182	1.8788	1.8525	1.8365	1.8290	1.8253	1.8218	1.8161	1.8003	1.7729
3	2.8497	2.7998	2.7680	2.7500	2.7408	2.7353	2.7278	2.7103	2.6790	2.6376
4	3.7707	3.7153	3.6815	3.6618	3.6508	3.6414	3.6220	3.5890	3.5436	3.4902
5	4.6862	4.6288	4.5933	4.5718	4.5568	4.5356	4.5007	4.4536	4.3963	4.3328
6	5.5997	5.5406	5.5033	5.4779	5.4511	5.4143	5.3654	5.3063	5.2389	5.1664
7	6.5115	6.4506	6.4093	6.3721	6.3298	6.2789	6.2181	6.1489	6.0724	5.9907
8	7.4215	7.3566	7.3036	7.2508	7.1944	7.1316	7.0606	6.9824	6.8968	6.8004
9	8.3275	8.2509	8.1823	8.1154	8.0471	7.9742	7.8942	7.8068	7.7064	7.5902
10	9.2217	9.1295	9.0469	8.9681	8.8896	8.8077	8.7185	8.6164	8.4963	8.3614
11	10.1004	9.9942	9.8996	9.8107	9.7232	9.6321	9.5282	9.4063	9.2675	9.1142
12	10.9651	10.8469	10.7422	10.6442	10.5476	10.4417	10.3181	10.1774	10.0203	9.8491
13	11.8178	11.6894	11.5757	11.4686	11.3572	11.2316	11.0892	10.9302	10.7551	10.5664
14	12.6603	12.5230	12.4001	12.2782	12.1471	12.0027	11.8420	11.6651	11.4725	11.2666
15	13.4939	13.3474	13.2097	13.0681	12.9182	12.7555	12.5769	12.3825	12.1727	11.9501
16	14.3183	14.1570	13.9996	13.8392	13.6710	13.4904	13.2942	13.0827	12.8561	12.6171
17	15.1279	14.9469	14.7707	14.5920	14.4059	14.2078	13.9944	13.7661	13.5232	13.2686
18	15.9178	15.7180	15.5235	15.3269	15.1232	14.9080	14.6779	14.4332	14.1747	13.9044
19	16.6889	16.4708	16.2584	16.0443	15.8234	15.5914	15.3449	15.0847	14.8105	14.5249
20	17.4417	17.2057	16.9757	16.7445	16.5069	16.2585	15.9964	15.7205	15.4310	15.1309
21	18.1766	17.9230	17.6759	17.4279	17.1739	16.9100	16.6323	16.3410	16.0370	15.7222
22	18.8939	18.6232	18.3594	18.0950	17.8254	17.5458	17.2528	16.9469	16.6283	16.2992
23	19.5941	19.3067	19.0264	18.7465	18.4613	18.1663	17.8587	17.5382	17.2053	16.8626
24	20.2776	19.9737	19.6779	19.3823	19.0818	18.7723	18.4500	18.1152	17.7686	17.4126
25	20.9446	20.6252	20.3138	20.0028	19.6877	19.3636	19.0270	18.6786	18.3187	17.9497
30	24.0497	23.6558	23.2719	22.8905	22.5065	22.1150	21.7127	21.2996	20.8762	20.4448
35	26.8012	26.3415	25.8929	25.4480	25.0017	24.5493	24.0876	23.6167	23.1367	22.6502
40	29.2355	28.7164	28.2099	27.7085	27.2071	26.7009	26.1868	25.5646	25.1347	24.5995
45	31.3871	30.8156	30.2579	29.7065	29.1564	28.6027	28.0421	27.4747	26.9007	26.3224
50	33.2889	32.6709	32.0680	31.4725	30.8793	30.2836	29.6820	29.0747	28.4616	27.8453

Notes: <1> Data Based on Assumed DOS of Apr 1994.
 Authorized Period of Use of Table is Oct 1993 through Sep 1994.

 <2> Tabulated Data Based on Criteria Contained in 18 Mar 91 Tri-Service Memorandum
 of Agreement on Criteria/Standards for EA/LCC for MILCON Design.
 Data Based on Discount Rate of 3.1% and DOE Projections of Future Price Level Changes
 for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1993).

 <3> Region 2: OH, IN, IL, MI, WI, MN, IA, MO, ND, SD, NE, KS

Table E-3-RO-2. Present Worth Factors--Residual Oil

Number of Payments	Beneficial Occupancy Date									
	Oct 1994	Oct 1995	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003
1	1.0016	0.9942	0.9831	0.9809	0.9867	0.9971	1.0074	1.0174	1.0248	1.0194
2	1.9959	1.9773	1.9640	1.9676	1.9838	2.0044	2.0248	2.0422	2.0441	2.0253
3	2.9790	2.9582	2.9507	2.9646	2.9911	3.0218	3.0495	3.0615	3.0501	3.0200
4	3.9598	3.9449	3.9477	3.9720	4.0086	4.0466	4.0689	4.0675	4.0448	4.0068
5	4.9465	4.9420	4.9551	4.9894	5.0333	5.0660	5.0748	5.0622	5.0315	4.9885
6	5.9436	5.9493	5.9725	6.0142	6.0527	6.0719	6.0695	6.0489	6.0132	5.9668
7	6.9510	6.9667	6.9973	7.0335	7.0586	7.0666	7.0563	7.0306	6.9915	6.9420
8	7.9684	7.9915	8.0167	8.0395	8.0533	8.0534	8.0380	8.0089	7.9667	7.9114
9	8.9931	9.0109	9.0226	9.0342	9.0401	9.0351	9.0163	8.9841	8.9362	8.8706
10	10.0125	10.0168	10.0173	10.0209	10.0218	10.0134	9.9915	9.9536	9.8954	9.8201
11	11.0184	11.0115	11.0040	11.0026	11.0001	10.9886	10.9610	10.9128	10.8449	10.7607
12	12.0132	11.9983	11.9858	11.9809	11.9753	11.9580	11.9201	11.8623	11.7855	11.6912
13	12.9999	12.9800	12.9640	12.9561	12.9447	12.9172	12.8697	12.8029	12.7159	12.6120
14	13.9816	13.9583	13.9393	13.9256	13.9039	13.8667	13.8103	13.7333	13.6368	13.5240
15	14.9599	14.9335	14.9087	14.8848	14.8534	14.8073	14.7407	14.6542	14.5487	14.4266
16	15.9351	15.9029	15.8679	15.8343	15.7941	15.7378	15.6616	15.5661	15.4514	15.3198
17	16.9046	16.8621	16.8174	16.7749	16.7245	16.6586	16.5735	16.4688	16.3446	16.2040
18	17.8637	17.8116	17.7580	17.7053	17.6454	17.5706	17.4762	17.3620	17.2287	17.0796
19	18.8133	18.7522	18.6884	18.6262	18.5573	18.4732	18.3693	18.2461	18.1044	17.9465
20	19.7539	19.6827	19.6093	19.5381	19.4600	19.3664	19.2535	19.1218	18.9713	18.8044
21	20.6843	20.6035	20.5212	20.4408	20.3531	20.2506	20.1292	19.9887	19.8291	19.6536
22	21.6052	21.5155	21.4239	21.3340	21.2373	21.1262	20.9961	20.8465	20.6783	20.4940
23	22.5171	22.4181	22.3171	22.2181	22.1130	21.9931	21.8539	21.6958	21.5187	21.3259
24	23.4198	23.3113	23.2013	23.0938	22.9798	22.8510	22.7031	22.5361	22.3506	22.1497
25	24.3129	24.1955	24.0769	23.9607	23.8377	23.7002	23.5435	23.3680	23.1745	22.9652
30	28.6467	28.4855	28.3232	28.1639	27.9985	27.8188	27.6204	27.4036	27.1686	26.9183
35	32.7653	32.5624	32.3587	32.1580	31.9516	31.7315	31.4931	31.2368	30.9627	30.6736
40	36.6780	36.4351	36.1919	35.9521	35.7069	35.4484	35.1721	34.8782	34.5669	34.2410
45	40.3949	40.1141	39.8333	39.5563	39.2743	38.9794	38.6670	38.3374	37.9907	37.6299
50	43.9259	43.6090	43.2925	42.9801	42.6632	42.3337	41.9870	41.6235	41.2433	40.8492

Notes: <1> Data Based on Assumed DOS of Apr 1994.
Authorized Period of Use of Table is Oct 1993 through Sep 1994.

<2> Tabulated Data Based on Criteria Contained in 18 Mar 91 Tri-Service Memorandum
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Data Based on Discount Rate of 3.1% and DOE Projections of Future Price Level Changes
for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1993).

<3> Region 2: OH, IN, IL, MI, WI, MN, IA, MO, ND, SD, NE, KS

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Table E-3-NG-2. Present Worth Factors--Natural Gas

Number of Payments	Beneficial Occupancy Date									
	Oct 1994	Oct 1995	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003
1	0.9970	0.9874	0.9705	0.9626	0.9598	0.9616	0.9666	0.9733	0.9836	0.9897
2	1.9844	1.9579	1.9331	1.9225	1.9214	1.9282	1.9398	1.9568	1.9732	1.9751
3	2.9549	2.9205	2.8929	2.8840	2.8880	2.9014	2.9234	2.9465	2.9586	2.9467
4	3.9175	3.8804	3.8545	3.8506	3.8613	3.8850	3.9131	3.9319	3.9303	3.9020
5	4.8774	4.8420	4.8211	4.8239	4.8448	4.8747	4.8985	4.9036	4.8856	4.8434
6	5.8390	5.8085	5.7944	5.8075	5.8345	5.8601	5.8701	5.8588	5.8270	5.7638
7	6.8055	6.7818	6.7779	6.7971	6.8197	6.8317	6.8254	6.8003	6.7474	6.6589
8	7.7788	7.7654	7.7676	7.7825	7.7916	7.7870	7.7668	7.7207	7.6425	7.5414
9	8.7624	8.7550	8.7530	8.7542	8.7468	8.7284	8.6872	8.6157	8.5249	8.4200
10	9.7520	9.7404	9.7247	9.7094	9.6883	9.6488	9.5823	9.4982	9.4036	9.2950
11	10.7374	10.7121	10.6799	10.6509	10.6087	10.5439	10.4648	10.3769	10.2786	10.1658
12	11.7091	11.6674	11.6214	11.5713	11.5038	11.4264	11.3434	11.2519	11.1494	11.0324
13	12.6644	12.6088	12.5418	12.4664	12.3862	12.3050	12.2184	12.1226	12.0160	11.8951
14	13.6058	13.5292	13.4368	13.3488	13.2649	13.1800	13.0892	12.9893	12.8787	12.7539
15	14.5262	14.4243	14.3193	14.2275	14.1399	14.0508	13.9559	13.8520	13.7375	13.6089
16	15.4213	15.3067	15.1979	15.1025	15.0106	14.9174	14.8185	14.7108	14.5924	14.4571
17	16.3037	16.1854	16.0729	15.9732	15.8773	15.7801	15.6773	15.5657	15.4407	15.2907
18	17.1824	17.0604	16.9437	16.8399	16.7400	16.6389	16.5323	16.4139	16.2743	16.1044
19	18.0574	17.9312	17.8104	17.7026	17.5988	17.4939	17.3805	17.2476	17.0879	16.8984
20	18.9281	18.7978	18.6731	18.5614	18.4537	18.3421	18.2142	18.0612	17.8820	17.6738
21	19.7948	19.6605	19.5319	19.4163	19.3019	19.1757	19.0278	18.8552	18.6573	18.4304
22	20.6575	20.5193	20.3868	20.2645	20.1356	19.9894	19.8218	19.6306	19.4140	19.1688
23	21.5163	21.3742	21.2350	21.0982	20.9492	20.7834	20.5972	20.3873	20.1523	19.8897
24	22.3712	22.2225	22.0687	21.9118	21.7432	21.5588	21.3538	21.1256	20.8733	20.5936
25	23.2194	23.0561	22.8823	22.7058	22.5186	22.3154	22.0922	21.8465	21.5771	21.2808
30	27.1928	26.9341	26.6676	26.4010	26.1256	25.8363	25.5288	25.2004	24.8498	24.4736
35	30.7136	30.3708	30.0215	29.6737	29.3185	28.9513	28.5679	28.1654	27.7424	27.2957
40	33.8286	33.4098	32.9865	32.5663	32.1406	31.7045	31.2540	30.7860	30.2991	29.7901
45	36.5819	36.0959	35.6071	35.1230	34.6349	34.1381	33.6281	33.1023	32.5589	31.9948
50	39.0154	38.4701	37.9233	37.3828	36.8396	36.2890	35.7266	35.1496	34.5563	33.9434

Notes: <1> Data Based on Assumed DOS of Apr 1994.
Authorized Period of Use of Table is Oct 1993 through Sep 1994.

<2> Tabulated Data Based on Criteria Contained in 18 Mar 91 Tri-Service Memorandum
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Data Based on Discount Rate of 3.1% and DOE Projections of Future Price Level Changes
for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1993).

<3> Region 2: OH, IN, IL, MI, WI, MN, IA, MO, ND, SD, NE, KS

Table E-3-SC-2. Present Worth Factors--Steam Coal

Number of Payments	Beneficial Occupancy Date									
	Oct 1994	Oct 1995	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003
1	0.9838	0.9643	0.9451	0.9230	0.9014	0.8891	0.8768	0.8616	0.8439	0.8264
2	1.9481	1.9094	1.8681	1.8244	1.7905	1.7659	1.7385	1.7055	1.6703	1.6382
3	2.8932	2.8324	2.7694	2.7135	2.6673	2.6276	2.5823	2.5319	2.4820	2.4403
4	3.8162	3.7337	3.6585	3.5903	3.5289	3.4714	3.4087	3.3437	3.2842	3.2376
5	4.7175	4.6228	4.5353	4.4519	4.3728	4.2978	4.2205	4.1458	4.0815	4.0272
6	5.6066	5.4996	5.3970	5.2958	5.1992	5.1096	5.0226	4.9431	4.8711	4.8066
7	6.4834	6.3613	6.2409	6.1222	6.0109	5.9117	5.8199	5.7327	5.6505	5.5757
8	7.3451	7.2052	7.0673	6.9339	6.8131	6.7090	6.6095	6.5121	6.4196	6.3324
9	8.1890	8.0316	7.8790	7.7361	7.6104	7.4986	7.3889	7.2813	7.1763	7.0766
10	9.0154	8.8433	8.6812	8.5334	8.4000	8.2780	8.1581	8.0379	7.9205	7.8084
11	9.8271	9.6455	9.4784	9.3230	9.1794	9.0472	8.9147	8.7821	8.6523	8.5280
12	10.6293	10.4427	10.2680	10.1024	9.9485	9.8038	9.6589	9.5140	9.3718	9.2353
13	11.4265	11.2323	11.0475	10.8715	10.7052	10.5480	10.3908	10.2335	10.0791	9.9304
14	12.2161	12.0118	11.8166	11.6282	11.4494	11.2799	11.1103	10.9408	10.7743	10.6135
15	12.9956	12.7809	12.5733	12.3724	12.1812	11.9994	11.8176	11.6359	11.4574	11.2846
16	13.7647	13.5376	13.3175	13.1042	12.9007	12.7067	12.5127	12.3190	12.1285	11.9456
17	14.5214	14.2818	14.0493	13.8237	13.6080	13.4018	13.1958	12.9902	12.7895	12.5963
18	15.2656	15.0136	14.7688	14.5310	14.3032	14.0849	13.8670	13.6511	13.4402	13.2354
19	15.9974	15.7331	15.4761	15.2262	14.9863	14.7561	14.5279	14.3019	14.0793	13.8628
20	16.7169	16.4404	16.1713	15.9093	15.6574	15.4170	15.1787	14.9409	14.7067	14.4802
21	17.4242	17.1356	16.8544	16.5804	16.3184	16.0678	15.8177	15.5683	15.3240	15.0876
22	18.1194	17.8187	17.5255	17.2414	16.9691	16.7068	16.4451	16.1857	15.9314	15.6850
23	18.8025	18.4898	18.1864	17.8921	17.6082	17.3342	17.0625	16.7931	16.5289	16.2726
24	19.4736	19.1507	18.8372	18.5312	18.2356	17.9516	17.6699	17.3905	17.1164	16.8503
25	20.1345	19.8015	19.4762	19.1586	18.8530	18.5590	18.2673	17.9781	17.6942	17.4182
30	23.2765	22.8902	22.5134	22.1461	21.7910	21.4478	21.1073	20.7696	20.4377	20.1145
35	26.1654	25.7302	25.3049	24.8896	24.4873	24.0975	23.7112	23.3285	22.9525	22.5858
40	28.8151	28.3341	27.8639	27.4044	26.9586	26.5261	26.0979	25.6739	25.2573	24.8508
45	31.2437	30.7207	30.2093	29.7092	29.2236	28.7521	28.2853	27.8236	27.3699	26.9268
50	33.4696	32.9082	32.3589	31.8218	31.2996	30.7922	30.2902	29.7939	29.3061	28.8296

Notes: <1> Data Based on Assumed DOS of Apr 1994.
         Authorized Period of Use of Table is Oct 1993 through Sep 1994.
         <2> Tabulated Data Based on Criteria Contained in 18 Mar 91 Tri-Service Memorandum
         of Agreement on Criteria/Standards for EA/LCC for MILCON Design.
         Data Based on Discount Rate of 3.1% and DOE Projections of Future Price Level Changes
         for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1993).
         <3> Region 2: OH, IN, IL, MI, WI, MN, IA, MO, ND, SD, NE, KS

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Table E-3-LP-2. Present Worth Factors--Liquefied Petroleum Gas (LPG)

Number of Payments	Beneficial Occupancy Date									
	Oct 1994	Oct 1995	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003
1	0.9540	0.9209	0.9023	0.8881	0.8780	0.8706	0.8634	0.8567	0.8488	0.8353
2	1.8750	1.8233	1.7905	1.7662	1.7487	1.7340	1.7201	1.7054	1.6841	1.6544
3	2.7773	2.7114	2.6685	2.6368	2.6120	2.5907	2.5688	2.5408	2.5031	2.4577
4	3.6654	3.5895	3.5391	3.5002	3.4687	3.4395	3.4042	3.3598	3.3065	3.2475
5	4.5435	4.4601	4.4025	4.3569	4.3175	4.2748	4.2232	4.1631	4.0963	4.0258
6	5.4141	5.3235	5.2592	5.2056	5.1528	5.0938	5.0265	4.9529	4.8745	4.7929
7	6.2775	6.1802	6.1080	6.0410	5.9752	5.8972	5.8163	5.7312	5.6416	5.5488
8	7.1342	7.0289	6.9433	6.8600	6.7752	6.6870	6.5946	6.4983	6.3975	6.2893
9	7.9829	7.8643	7.7623	7.6633	7.5650	7.4652	7.3617	7.2542	7.1381	7.0099
10	8.8183	8.6833	8.5657	8.4531	8.3433	8.2324	8.1176	7.9947	7.8587	7.7112
11	9.6373	9.4866	9.3555	9.2314	9.1104	8.9883	8.8581	8.7154	8.5599	8.3936
12	10.4406	10.2764	10.1338	9.9985	9.8663	9.7288	9.5788	9.4166	9.2423	9.0576
13	11.2304	11.0547	10.9009	10.7544	10.6068	10.4494	10.2800	10.0990	9.9064	9.7038
14	12.0087	11.8218	11.6568	11.4949	11.3274	11.1506	10.9624	10.7630	10.5525	10.3325
15	12.7758	12.5777	12.3973	12.2156	12.0287	11.8330	11.6264	11.4092	11.1813	10.9443
16	13.5317	13.3182	13.1179	12.9168	12.7111	12.4971	12.2726	12.0380	11.7931	11.5397
17	14.2722	14.0388	13.8191	13.5992	13.3751	13.1432	12.9014	12.6498	12.3884	12.1190
18	14.9929	14.7401	14.5015	14.2632	14.0212	13.7720	13.5132	13.2451	12.9677	12.6827
19	15.6941	15.4225	15.1656	14.9094	14.6500	14.3838	14.1085	13.8244	13.5314	13.2311
20	16.3765	16.0865	15.8117	15.5382	15.2618	14.9792	14.6878	14.3881	14.0799	13.7648
21	17.0405	16.7327	16.4405	16.1500	15.8572	15.5585	15.2515	14.9366	14.6136	14.2843
22	17.6867	17.3614	17.0523	16.7453	16.4365	16.1221	15.8000	15.4703	15.1331	14.7898
23	18.3155	17.9733	17.6477	17.3246	17.0002	16.6706	16.3337	15.9898	15.6386	15.2816
24	18.9273	18.5686	18.2270	17.8883	17.5486	17.2043	16.8532	16.4952	16.1304	15.7604
25	19.5226	19.1479	18.7906	18.4368	18.0823	17.7238	17.3586	16.9871	16.6091	16.2262
30	22.2673	21.8187	21.3896	20.9660	20.5436	20.1188	19.6893	19.2553	18.8166	18.3747
35	24.6623	24.1494	23.6579	23.1735	22.6922	22.2102	21.7250	21.2368	20.7453	20.2521
40	26.7536	26.1851	25.6393	25.1022	24.5696	24.0376	23.5037	22.9682	22.4306	21.8925
45	28.5810	27.9638	27.3707	26.7875	26.2100	25.6343	25.0580	24.4811	23.9032	23.3259
50	30.1778	29.5181	28.8836	28.2601	27.6434	27.0295	26.4161	25.8030	25.1899	24.5784

Notes:　<1> Data Based on Assumed DOS of Apr 1994.
　　　　　　Authorized Period of Use of Table is Oct 1993 through Sep 1994.
　　　<2> Tabulated Data Based on Criteria Contained in 18 Mar 91 Tri-Service Memorandum
　　　　　　of Agreement on Criteria/Standards for EA/LCC for MILCON Design.
　　　　　　Data Based on Discount Rate of 3.1% and DOE Projections of Future Price Level Changes
　　　　　　for Residential Sector (NIST Annual Supplement to Handbook 135, Oct 1993).
　　　<3> Region 2: OH, IN, IL, MI, WI, MN, IA, MO, ND, SD, NE, KS

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Table E-3-EL-3. Present Worth Factors--Electricity

Number of Payments	Beneficial Occupancy Date									
	Oct 1994	Oct 1995	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003
1	0.9764	0.9507	0.9244	0.9000	0.8781	0.8622	0.8457	0.8258	0.8089	0.7932
2	1.9271	1.8751	1.8244	1.7781	1.7403	1.7079	1.6714	1.6347	1.6021	1.5673
3	2.8515	2.7751	2.7024	2.6403	2.5859	2.5336	2.4804	2.4279	2.3763	2.3204
4	3.7515	3.6531	3.5646	3.4859	3.4117	3.3426	3.2736	3.2020	3.1293	3.0529
5	4.6296	4.5153	4.4103	4.3117	4.2207	4.1358	4.0477	3.9551	3.8618	3.7659
6	5.4918	5.3610	5.2361	5.1207	5.0138	4.9099	4.8008	4.6876	4.5749	4.4573
7	6.3374	6.1868	6.0450	5.9138	5.7880	5.6630	5.5333	5.4006	5.2663	5.1279
8	7.1632	6.9957	6.8382	6.6880	6.5410	6.3955	6.2463	6.0920	5.9368	5.7808
9	7.9722	7.7889	7.6123	7.4410	7.2736	7.1085	6.9377	6.7626	6.5898	6.4162
10	8.7653	8.5631	8.3654	8.1736	7.9866	7.7999	7.6083	7.4155	7.2251	7.0346
11	9.5395	9.3161	9.0979	8.8866	8.6780	8.4705	8.2612	8.0509	7.8435	7.6365
12	10.2925	10.0486	9.8110	9.5780	9.3485	9.1234	8.8965	8.6693	8.4454	8.2223
13	11.0251	10.7617	10.5023	10.2485	10.0015	9.7587	9.5149	9.2712	9.0313	8.7925
14	11.7381	11.4530	11.1729	10.9015	10.6368	10.3771	10.1169	9.8570	9.6015	9.3475
15	12.4295	12.1236	11.8259	11.5368	11.2552	10.9791	10.7027	10.4272	10.1565	9.8878
16	13.1000	12.7766	12.4612	12.1552	11.8571	11.5649	11.2729	10.9822	10.6968	10.4137
17	13.7530	13.4119	13.0796	12.7571	12.4430	12.1351	11.8279	11.5225	11.2227	10.9255
18	14.3883	14.0303	13.6815	13.3430	13.0132	12.6901	12.3682	12.0484	11.7345	11.4237
19	15.0067	14.6322	14.2673	13.9132	13.5682	13.2304	12.8941	12.5603	12.2326	11.9085
20	15.6086	15.2180	14.8376	14.4682	14.1085	13.7563	13.4059	13.0584	12.7174	12.3805
21	16.1945	15.7883	15.3925	15.0085	14.6344	14.2681	13.9041	13.5432	13.1894	12.8398
22	16.7647	16.3432	15.9329	15.5344	15.1462	14.7663	14.3889	14.0152	13.6487	13.2868
23	17.3197	16.8836	16.4588	16.0462	15.6443	15.2511	14.8608	14.4745	14.0957	13.7220
24	17.8600	17.4095	16.9706	16.5443	16.1291	15.7230	15.3202	14.9215	14.5309	14.1456
25	18.3859	17.9213	17.4687	17.0291	16.6011	16.1824	15.7672	15.3567	14.9545	14.5578
30	20.8119	20.2825	19.7670	19.2662	18.7785	18.3016	17.8300	17.3644	16.9088	16.4600
35	22.9312	22.3453	21.7748	21.2205	20.6807	20.1533	19.6325	19.1191	18.6168	18.1227
40	24.7829	24.1478	23.5294	22.9285	22.3434	21.7718	21.2080	20.6527	20.1097	19.5760
45	26.4014	25.7233	25.0631	24.4214	23.7966	23.1865	22.5851	21.9933	21.4146	20.8462
50	27.8160	27.1004	26.4036	25.7263	25.0669	24.4230	23.7888	23.1650	22.5552	21.9565

Notes: <1> Data Based on Assumed DOS of Apr 1994.
Authorized Period of Use of Table is Oct 1993 through Sep 1994.
<2> Tabulated Data Based on Criteria Contained in 18 Mar 91 Tri-Service Memorandum
of Agreement on Criteria/Standards for EA/LCC for MILCON Design.
Data Based on Discount Rate of 3.1% and DOE Projections of Future Price Level Changes
for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1993).
<3> Region 3: DE, MD, DC, VA, WV, NC, SC, GA, FL, KY, TN, AL, MS, AR, LA, OK, TX

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Table E-3-DO-3. Present Worth Factors--Distillate Oil

Number of Payments	Beneficial Occupancy Date									
	Oct 1994	Oct 1995	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003
1	0.9709	0.9476	0.9323	0.9225	0.9178	0.9169	0.9169	0.9160	0.9129	0.9015
2	1.9185	1.8798	1.8548	1.8403	1.8347	1.8338	1.8329	1.8289	1.8144	1.7870
3	2.8508	2.8023	2.7726	2.7572	2.7516	2.7498	2.7458	2.7304	2.6999	2.6587
4	3.7733	3.7202	3.6895	3.6741	3.6677	3.6627	3.6473	3.6159	3.5716	3.5188
5	4.6911	4.6370	4.6064	4.5902	4.5806	4.5642	4.5328	4.4877	4.4317	4.3693
6	5.6080	5.5539	5.5224	5.5031	5.4820	5.4497	5.4045	5.3478	5.2822	5.2112
7	6.5249	6.4700	6.4353	6.4046	6.3675	6.3214	6.2647	6.1982	6.1241	6.0442
8	7.4409	7.3829	7.3368	7.2900	7.2393	7.1816	7.1151	7.0401	6.9571	6.8627
9	8.3538	8.2844	8.2223	8.1618	8.0994	8.0320	7.9570	7.8732	7.7756	7.6614
10	9.2553	9.1699	9.0940	9.0219	8.9498	8.8739	8.7901	8.6917	8.5743	8.4413
11	10.1408	10.0416	9.9542	9.8723	9.7917	9.7070	9.6086	9.4904	9.3542	9.2028
12	11.0125	10.9017	10.8046	10.7142	10.6248	10.5255	10.4073	10.2702	10.1157	9.9457
13	11.8727	11.7522	11.6465	11.5473	11.4433	11.3241	11.1871	11.0317	10.8586	10.6711
14	12.7231	12.5940	12.4796	12.3658	12.2420	12.1040	11.9486	11.7747	11.5840	11.3792
15	13.5650	13.4271	13.2981	13.1645	13.0218	12.8655	12.6915	12.5000	12.2921	12.0706
16	14.3980	14.2456	14.0967	13.9443	13.7833	13.6084	13.4169	13.2082	12.9835	12.7455
17	15.2166	15.0443	14.8766	14.7058	14.5263	14.3338	14.1251	13.8995	13.6583	13.4038
18	16.0152	15.8242	15.6381	15.4488	15.2516	15.0420	14.8164	14.5744	14.3167	14.0464
19	16.7951	16.5857	16.3810	16.1741	15.9598	15.7333	15.4913	15.2327	14.9593	14.6737
20	17.5566	17.3286	17.1064	16.8823	16.6511	16.4082	16.1496	15.8754	15.5866	15.2859
21	18.2995	18.0540	17.8146	17.5736	17.3260	17.0665	16.7923	16.5026	16.1988	15.8839
22	19.0249	18.7621	18.5059	18.2485	17.9843	17.7091	17.4195	17.1149	16.7968	16.4675
23	19.7330	19.4534	19.1808	18.9069	18.6270	18.3364	18.0318	17.7128	17.3804	17.0371
24	20.4244	20.1283	19.8391	19.5495	19.2542	18.9486	18.6297	18.2964	17.9499	17.5933
25	21.0993	20.7867	20.4817	20.1767	19.8665	19.5466	19.2133	18.8660	18.5062	18.1360
30	24.2377	23.8504	23.4724	23.0963	22.7166	22.3284	21.9287	21.5168	21.0939	20.6624
35	27.0195	26.5658	26.1232	25.6840	25.2430	24.7953	24.3375	23.8688	23.3904	22.9049
40	29.4864	28.9745	28.4752	27.9806	27.4854	26.9849	26.4755	25.9564	25.4289	24.8953
45	31.6760	31.1125	30.5628	30.0190	29.4759	28.9284	28.3732	27.8094	27.2382	26.6620
50	33.6195	33.0103	32.4158	31.8284	31.2426	30.6535	30.0576	29.4542	28.8442	28.2302

Notes: <1> Data Based on Assumed DOS of Apr 1994.
            Authorized Period of Use of Table is Oct 1993 through Sep 1994.

        <2> Tabulated Data Based on Criteria Contained in 18 Mar 91 Tri-Service Memorandum
            of Agreement on Criteria/Standards for EA/LCC for MILCON Design.
            Data Based on Discount Rate of 3.1% and DOE Projections of Future Price Level Changes
            for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1993).

        <3> Region 3: DE, MD, DC, VA, WV, NC, SC, GA, FL, KY, TN, AL, MS, AR, LA, OK, TX

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Table E-3-RO-3. Present Worth Factors--Residual Oil

Number of Payments	Beneficial Occupancy Date									
	Oct 1994	Oct 1995	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003
1	1.0031	0.9951	0.9848	0.9853	0.9912	1.0032	1.0167	1.0284	1.0372	1.0326
2	1.9982	1.9798	1.9701	1.9765	1.9944	2.0199	2.0451	2.0655	2.0698	2.0521
3	2.9829	2.9651	2.9613	2.9797	3.0111	3.0483	3.0822	3.0981	3.0893	3.0597
4	3.9683	3.9563	3.9645	3.9965	4.0395	4.0854	4.1148	4.1177	4.0969	4.0600
5	4.9595	4.9596	4.9812	5.0248	5.0766	5.1180	5.1344	5.1252	5.0971	5.0559
6	5.9627	5.9763	6.0096	6.0620	6.1092	6.1376	6.1419	6.1255	6.0931	6.0481
7	6.9794	7.0046	7.0467	7.0946	7.1288	7.1452	7.1422	7.1214	7.0853	7.0391
8	8.0077	8.0418	8.0793	8.1141	8.1364	8.1454	8.1381	8.1136	8.0763	8.0250
9	9.0449	9.0744	9.0989	9.1217	9.1366	9.1414	9.1303	9.1046	9.0622	9.0010
10	10.0775	10.0939	10.1065	10.1219	10.1326	10.1335	10.1213	10.0905	10.0382	9.9668
11	11.0970	11.1015	11.1067	11.1179	11.1247	11.1246	11.1073	11.0665	11.0040	10.9221
12	12.1046	12.1017	12.1027	12.1101	12.1158	12.1105	12.0832	12.0323	11.9593	11.8676
13	13.1049	13.0977	13.0948	13.1011	13.1017	13.0865	13.0490	12.9876	12.9048	12.8040
14	14.1008	14.0899	14.0859	14.0870	14.0777	14.0522	14.0043	13.9331	13.8412	13.7310
15	15.0930	15.0809	15.0718	15.0630	15.0434	15.0075	14.9498	14.8695	14.7681	14.6482
16	16.0840	16.0668	16.0477	16.0288	15.9987	15.9531	15.8862	15.7965	15.6853	15.5563
17	17.0699	17.0428	17.0135	16.9841	16.9443	16.8894	16.8132	16.7137	16.5934	16.4558
18	18.0459	18.0086	17.9688	17.9296	17.8806	17.8164	17.7304	17.6218	17.4929	17.3464
19	19.0117	18.9639	18.9144	18.8660	18.8076	18.7336	18.6385	18.5213	18.3836	18.2278
20	19.9670	19.9094	19.8507	19.7929	19.7248	19.6417	19.5380	19.4119	19.2650	19.1005
21	20.9125	20.8458	20.7777	20.7102	20.6329	20.5412	20.4286	20.2933	20.1377	19.9643
22	21.8489	21.7727	21.6949	21.6183	21.5324	21.4318	21.3100	21.1661	21.0015	20.8189
23	22.7759	22.6900	22.6030	22.5178	22.4230	22.3133	22.1828	22.0298	21.8560	21.6646
24	23.6931	23.5981	23.5025	23.4084	23.3045	23.1860	23.0465	22.8844	22.7018	22.5021
25	24.6012	24.4976	24.3931	24.2898	24.1772	24.0497	23.9011	23.7302	23.5392	23.3309
30	29.0092	28.8606	28.7114	28.5640	28.4075	28.2369	28.0463	27.8345	27.6033	27.3556
35	33.1964	33.0059	32.8157	32.6281	32.4322	32.2229	31.9940	31.7442	31.4754	31.1905
40	37.1824	36.9536	36.7255	36.5002	36.2671	36.0209	35.7555	35.4696	35.1649	34.8445
45	40.9804	40.7151	40.4508	40.1897	39.9212	39.6398	39.3397	39.0192	38.6805	38.3262
50	44.5993	44.2992	44.0004	43.7053	43.4029	43.0881	42.7547	42.4015	42.0302	41.6438

Notes:
<1> Data Based on Assumed DOS of Apr 1994.
    Authorized Period of Use of Table is Oct 1993 through Sep 1994.
<2> Tabulated Data Based on Criteria Contained in 18 Mar 91 Tri-Service Memorandum
    of Agreement on Criteria/Standards for EA/LCC for MILCON Design.
    Data Based on Discount Rate of 3.1% and DOE Projections of Future Price Level Changes
    for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1993).
<3> Region 3: DE, MD, DC, VA, WV, NC, SC, GA, FL, KY, TN, AL, MS, AR, LA, OK, TX

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Table E-3-NG-3. Present Worth Factors--Natural Gas

Number of Payments	Beneficial Occupancy Date									
	Oct 1994	Oct 1995	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003
1	1.0092	1.0120	1.0010	1.0016	1.0114	1.0276	1.0469	1.0684	1.0952	1.1152
2	2.0212	2.0129	2.0026	2.0130	2.0390	2.0745	2.1153	2.1636	2.2104	2.2345
3	3.0221	3.0145	3.0140	3.0406	3.0859	3.1429	3.2105	3.2788	3.3297	3.3443
4	4.0237	4.0259	4.0416	4.0875	4.1543	4.2381	4.3257	4.3981	4.4395	4.4417
5	5.0351	5.0535	5.0885	5.1559	5.2495	5.3533	5.4450	5.5079	5.5368	5.5275
6	6.0628	6.1005	6.1569	6.2511	6.3648	6.4726	6.5548	6.6052	6.6226	6.5905
7	7.1097	7.1688	7.2521	7.3663	7.4840	7.5825	7.6521	7.6910	7.6857	7.6251
8	8.1781	8.2640	8.3673	8.4856	8.5939	8.6798	8.7379	8.7541	8.7203	8.6470
9	9.2733	9.3793	9.4866	9.5955	9.6912	9.7656	9.8010	9.7887	9.7422	9.6650
10	10.3885	10.4985	10.5964	10.6928	10.7770	10.8286	10.8356	10.8105	10.7602	10.6784
11	11.5078	11.6084	11.6937	11.7786	11.8400	11.8632	11.8575	11.8286	11.7736	11.6866
12	12.6176	12.7057	12.7795	12.8416	12.8746	12.8851	12.8755	12.8420	12.7818	12.6901
13	13.7149	13.7915	13.8426	13.8762	13.8965	13.9031	13.8889	13.8502	13.7853	13.6891
14	14.8007	14.8545	14.8772	14.8981	14.9145	14.9165	14.8971	14.8537	14.7843	14.6840
15	15.8637	15.8891	15.8990	15.9161	15.9279	15.9248	15.9006	15.8527	15.7792	15.6741
16	16.8984	16.9110	16.9171	16.9295	16.9362	16.9282	16.8996	16.8475	16.7693	16.6597
17	17.9202	17.9290	17.9305	17.9378	17.9396	17.9272	17.8945	17.8377	17.7549	17.6412
18	18.9382	18.9424	18.9387	18.9412	18.9386	18.9221	18.8846	18.8233	18.7364	18.6177
19	19.9517	19.9507	19.9422	19.9402	19.9335	19.9122	19.8702	19.8048	19.7129	19.5897
20	20.9599	20.9541	20.9412	20.9351	20.9236	20.8979	20.8517	20.7813	20.6849	20.5572
21	21.9633	21.9531	21.9360	21.9252	21.9093	21.8793	21.8282	21.7533	21.6524	21.5204
22	22.9623	22.9480	22.9262	22.9109	22.8907	22.8559	22.8002	22.7208	22.6156	22.4795
23	23.9572	23.9381	23.9118	23.8923	23.8673	23.8278	23.7677	23.6840	23.5747	23.4345
24	24.9474	24.9238	24.8933	24.8689	24.8392	24.7953	24.7309	24.6431	24.5297	24.3849
25	25.9330	25.9052	25.8698	25.8408	25.8067	25.7585	25.6900	25.5981	25.4801	25.3308
30	30.7937	30.7435	30.6866	30.6361	30.5803	30.5103	30.4196	30.3053	30.1651	29.9937
35	35.5454	35.4732	35.3938	35.3210	35.2432	35.1513	35.0389	34.9028	34.7411	34.5482
40	40.1865	40.0924	39.9913	39.8970	39.7978	39.6845	39.5508	39.3936	39.2107	38.9969
45	44.7196	44.6043	44.4821	44.3666	44.2464	44.1123	43.9578	43.7799	43.5765	43.3422
50	49.1474	49.0113	48.8684	48.7324	48.5917	48.4372	48.2624	48.0643	47.8408	47.5864

Notes: <1> Data Based on Assumed DOS of Apr 1994.
             Authorized Period of Use of Table is Oct 1993 through Sep 1994.
        <2> Tabulated Data Based on Criteria Contained in 18 Mar 91 Tri-Service Memorandum
             of Agreement on Criteria/Standards for EA/LCC for MILCON Design.
             Data Based on Discount Rate of 3.1% and DOE Projections of Future Price Level Changes
             for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1993).
        <3> Region 3: DE, MD, DC, VA, WV, NC, SC, GA, FL, TN, AL, MS, AR, LA, OK, TX

Table E-3-SC-3. Present Worth Factors--Steam Coal

Number of Payments	Beneficial Occupancy Date									
	Oct 1994	Oct 1995	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003
1	0.9878	0.9784	0.9686	0.9532	0.9403	0.9376	0.9294	0.9135	0.8977	0.8798
2	1.9662	1.9470	1.9218	1.8934	1.8779	1.8669	1.8428	1.8112	1.7775	1.7441
3	2.9349	2.9002	2.8621	2.8310	2.8072	2.7804	2.7405	2.6909	2.6418	2.5994
4	3.8880	3.8405	3.7997	3.7604	3.7207	3.6781	3.6203	3.5553	3.4971	3.4457
5	4.8283	4.7780	4.7290	4.6739	4.6184	4.5579	4.4846	4.4106	4.3434	4.2805
6	5.7659	5.7074	5.6425	5.5716	5.4982	5.4222	5.3400	5.2568	5.1782	5.1077
7	6.6952	6.6209	6.5402	6.4513	6.3625	6.2776	6.1862	6.0916	6.0054	5.9270
8	7.6087	7.5186	7.4200	7.3157	7.2178	7.1238	7.0210	6.9188	6.8247	6.7346
9	8.5064	8.3984	8.2843	8.1710	8.0641	7.9586	7.8482	7.7382	7.6323	7.5285
10	9.3862	9.2627	9.1396	9.0172	8.8989	8.7858	8.6676	8.5457	8.4262	8.3089
11	10.2505	10.1180	9.9859	9.8520	9.7261	9.6051	9.4751	9.3397	9.2066	9.0775
12	11.1058	10.9642	10.8207	10.6792	10.5454	10.4127	10.2690	10.1200	9.9752	9.8343
13	11.9521	11.7990	11.6479	11.4986	11.3530	11.2066	11.0494	10.8886	10.7320	10.5779
14	12.7869	12.6262	12.4672	12.3061	12.1469	11.9870	11.8180	11.6455	11.4756	11.3082
15	13.6141	13.4456	13.2748	13.1000	12.9273	12.7556	12.5749	12.3890	12.2059	12.0269
16	14.4334	14.2531	14.0687	13.8804	13.6959	13.5124	13.3184	13.1193	12.9246	12.7340
17	15.2410	15.0471	14.8491	14.6490	14.4527	14.2560	14.0487	13.8380	13.6317	13.4283
18	16.0349	15.8274	15.6177	15.4059	15.1963	14.9863	14.7674	14.5452	14.3260	14.1110
19	16.8153	16.5960	16.3745	16.1494	15.9266	15.7050	15.4746	15.2394	15.0087	14.7825
20	17.5839	17.3529	17.1181	16.8797	16.6453	16.4121	16.1688	15.9222	15.6802	15.4426
21	18.3407	18.0964	17.8484	17.5984	17.3524	17.1064	16.8516	16.5936	16.3403	16.0927
22	19.0843	18.8267	18.5671	18.3056	18.0467	17.7892	17.5230	17.2538	16.9904	16.7317
23	19.8146	19.5455	19.2742	18.9998	18.7295	18.4606	18.1831	17.9039	17.6294	17.3595
24	20.5333	20.2526	19.9685	19.6826	19.4009	19.1207	18.8333	18.5428	18.2572	17.9775
25	21.2404	20.9468	20.6512	20.3540	20.0610	19.7708	19.4722	19.1707	18.8752	18.5845
30	24.5991	24.2502	23.8997	23.5490	23.2029	22.8587	22.5076	22.1550	21.8090	21.4695
35	27.6870	27.2856	26.8841	26.4829	26.0879	25.6967	25.2993	24.9012	24.5104	24.1269
40	30.5250	30.0773	29.6303	29.1843	28.7453	28.3107	27.8706	27.4307	26.9986	26.5744
45	33.1390	32.6487	32.1597	31.6725	31.1929	30.7184	30.2391	29.7604	29.2904	28.8289
50	35.5467	35.0171	34.4895	33.9642	33.4473	32.9360	32.4205	31.9063	31.4013	30.9053

Notes:
<1> Data Based on Assumed DOS of Apr 1994.
Authorized Period of Use of Table is Oct 1993 through Sep 1994.
<2> Tabulated Data Based on Criteria Contained in 18 Mar 91 Tri-Service Memorandum of Agreement on Criteria/Standards for EA/LCC for MILCON Design.
Data Based on Discount Rate of 3.1% and DOE Projections of Future Price Level Changes for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1993).
<3> Region 3: DE, MD, DC, VA, WV, NC, SC, GA, FL, KY, TN, AL, MS, AR, LA, OK, TX

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Table E-3-LP-3. Present Worth Factors--Liquefied Petroleum Gas (LPG)

Number of Payments	Beneficial Occupancy Date									
	Oct 1994	Oct 1995	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003
1	0.9578	0.9258	0.9055	0.8893	0.8762	0.8655	0.8554	0.8455	0.8348	0.8193
2	1.8836	1.8313	1.7948	1.7655	1.7417	1.7209	1.7009	1.6803	1.6540	1.6211
3	2.7891	2.7206	2.6710	2.6310	2.5971	2.5664	2.5357	2.4996	2.4559	2.4066
4	3.6784	3.5968	3.5364	3.4864	3.4426	3.4012	3.3550	3.3014	3.2413	3.1771
5	4.5546	4.4623	4.3918	4.3319	4.2774	4.2205	4.1568	4.0869	4.0119	3.9345
6	5.4200	5.3177	5.2374	5.1667	5.0967	5.0223	4.9423	4.8574	4.7693	4.6796
7	6.2755	6.1632	6.0721	5.9860	5.8985	5.8078	5.7128	5.6148	5.5143	5.4122
8	7.1210	6.9980	6.8914	6.7878	6.6840	6.5783	6.4703	6.3599	6.2470	6.1289
9	7.9557	7.8172	7.6933	7.5732	7.4545	7.3357	7.2153	7.0925	6.9637	6.8263
10	8.7750	8.6191	8.4787	8.3438	8.2119	8.0808	7.9479	7.8092	7.6610	7.5048
11	9.5769	9.4045	9.2493	9.1012	8.9570	8.8134	8.6646	8.5066	8.3396	8.1650
12	10.3623	10.1751	10.0067	9.8463	9.6896	9.5301	9.3620	9.1851	8.9998	8.8077
13	11.1329	10.9325	10.7517	10.5789	10.4063	10.2275	10.0405	9.8453	9.6425	9.4332
14	11.8903	11.6775	11.4844	11.2956	11.1037	10.9060	10.7007	10.4880	10.2680	10.0419
15	12.6353	12.4102	12.2011	11.9930	11.7822	11.5662	11.3434	11.1135	10.8767	10.6341
16	13.3680	13.1269	12.8984	12.6715	12.4424	12.2089	11.9690	11.7222	11.4689	11.2103
17	14.0847	13.8242	13.5769	13.3317	13.0851	12.8344	12.5776	12.3144	12.0451	11.7709
18	14.7820	14.5028	14.2372	13.9744	13.7106	13.4431	13.1698	12.8906	12.6057	12.3166
19	15.4605	15.1630	14.8798	14.5999	14.3193	14.0353	13.7460	13.4512	13.1513	12.8477
20	16.1208	15.8057	15.5054	15.2086	14.9115	14.6115	14.3066	13.9969	13.6824	13.3644
21	16.7634	16.4312	16.1140	15.8008	15.4877	15.1721	14.8523	14.5280	14.1991	13.8671
22	17.3890	17.0399	16.7062	16.3770	16.0483	15.7178	15.3834	15.0447	14.7019	14.3564
23	17.9976	17.6321	17.2824	16.9376	16.5940	16.2489	15.9001	15.5474	15.1912	14.8326
24	18.5899	18.2083	17.8431	17.4833	17.1251	16.7656	16.4028	16.0367	15.6674	15.2959
25	19.1660	18.7689	18.3887	18.0144	17.6418	17.2683	16.8921	16.5129	16.1307	15.7466
30	21.8228	21.3544	20.9047	20.4626	20.0240	19.5865	19.1479	18.7080	18.2668	17.8256
35	24.1410	23.6102	23.0999	22.5988	22.1030	21.6098	21.1171	20.6244	20.1320	19.6408
40	26.1644	25.5793	25.0163	24.4639	23.9182	23.3764	22.8364	22.2977	21.7604	21.2256
45	27.9309	27.2986	26.6895	26.0923	25.5030	24.9188	24.3375	23.7586	23.1822	22.6094
50	29.4734	28.7997	28.1505	27.5141	26.8868	26.2655	25.6481	25.0342	24.4236	23.8175

Notes: <1> Data Based on Assumed DOS of Apr 1994.
                 Authorized Period of Use of Table is Oct 1993 through Sep 1994.
          <2> Tabulated Data Based on Criteria Contained in 18 Mar 91 Tri-Service Memorandum
                 of Agreement on Criteria/Standards for EA/LCC for MILCON Design.
                 Data Based on Discount Rate of 3.1% and DOE Projections of Future Price Level Changes
                 for Residential Sector (NIST Annual Supplement to Handbook 135, Oct 1993).
          <3> Region 3: DE, MD, DC, VA, WV, NC, SC, GA, FL, KY, TN, AL, MS, AR, LA, OK, TX

Table E-3-EL-4. Present Worth Factors--Electricity

Number of Payments	Beneficial Occupancy Date									
	Oct 1994	Oct 1995	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003
1	0.9727	0.9461	0.9247	0.9078	0.8884	0.8699	0.8534	0.8372	0.8187	0.7993
2	1.9187	1.8708	1.8325	1.7962	1.7583	1.7233	1.6906	1.6558	1.6180	1.5783
3	2.8434	2.7786	2.7209	2.6661	2.6117	2.5605	2.5093	2.4551	2.3970	2.3356
4	3.7512	3.6670	3.5908	3.5195	3.4489	3.3792	3.3085	3.2341	3.1543	3.0711
5	4.6396	4.5369	4.4442	4.3567	4.2675	4.1784	4.0875	3.9914	3.8898	3.7851
6	5.5095	5.3903	5.2814	5.1754	5.0668	4.9574	4.8448	4.7269	4.6038	4.4757
7	6.3629	6.2274	6.1000	5.9746	5.8458	5.7147	5.5803	5.4410	5.2944	5.1421
8	7.2001	7.0461	6.8993	6.7536	6.6031	6.4502	6.2944	6.1315	5.9607	5.7882
9	8.0188	7.8454	7.6783	7.5109	7.3386	7.1643	6.9850	6.7979	6.6069	6.4169
10	8.8180	8.6244	8.4356	8.2464	8.0527	7.8549	7.6513	7.4440	7.2356	7.0289
11	9.5971	9.3817	9.1711	8.9605	8.7432	8.5212	8.2974	8.0727	7.8476	7.6246
12	10.3544	10.1172	9.8852	9.6511	9.4096	9.1673	8.9261	8.6847	8.4432	8.2044
13	11.0899	10.8312	10.5757	10.3174	10.0557	9.7960	9.5381	9.2804	9.0231	8.7688
14	11.8039	11.5218	11.2421	10.9635	10.6844	10.4080	10.1338	9.8602	9.5874	9.3181
15	12.4945	12.1882	11.8882	11.5922	11.2964	11.0037	10.7136	10.4246	10.1368	9.8527
16	13.1608	12.8343	12.5169	12.2042	11.8921	11.5835	11.2780	10.9739	10.6714	10.3731
17	13.8070	13.4630	13.1289	12.7999	12.4719	12.1479	11.8273	11.5086	11.1918	10.8796
18	14.4357	14.0750	13.7246	13.3797	13.0363	12.6972	12.3620	12.0290	11.6983	11.3726
19	15.0477	14.6707	14.3044	13.9441	13.5856	13.2319	12.8824	12.5355	12.1913	11.8524
20	15.6433	15.2505	14.8688	14.4934	14.1203	13.7523	13.3889	13.0285	12.6711	12.3194
21	16.2232	15.8149	15.4181	15.0281	14.6407	14.2588	13.8819	13.5083	13.1381	12.7740
22	16.7875	16.3642	15.9528	15.5485	15.1472	14.7518	14.3617	13.9752	13.5927	13.2165
23	17.3369	16.8989	16.4732	16.0550	15.6402	15.2316	14.8287	14.4299	14.0352	13.6471
24	17.8715	17.4193	16.9797	16.5480	16.1200	15.6986	15.2833	14.8723	14.4658	14.0663
25	18.3919	17.9258	17.4727	17.0278	16.5869	16.1532	15.7258	15.3030	14.8850	14.4743
30	20.7928	20.2626	19.7472	19.2417	18.7419	18.2505	17.7672	17.2900	16.8192	16.3571
35	22.8902	22.3040	21.7342	21.1758	20.6246	20.0833	19.5514	19.0269	18.5100	18.0031
40	24.7230	24.0882	23.4711	22.8667	22.2706	21.6857	21.1112	20.5454	19.9882	19.4421
45	26.3253	25.6481	24.9896	24.3449	23.7096	23.0866	22.4750	21.8730	21.2806	20.7002
50	27.7262	27.0118	26.3172	25.6373	24.9677	24.3113	23.6672	23.0336	22.4105	21.8001

Notes: <1> Data Based on Assumed DOS of Apr 1994.
Authorized Period of Use of Table is Oct 1993 through Sep 1994.

<2> Tabulated Data Based on Criteria Contained in 18 Mar 91 Tri-Service Memorandum
of Agreement on Criteria/Standards for EA/LCC for MILCON Design.
Data Based on Discount Rate of 3.1% and DOE Projections of Future Price Level Changes
for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1993).

<3> Region 4: MT, ID, WY, CO, NM, AZ, UT, NV, WA, OR, CA, AK, HI

Table E-3-DO-4. Present Worth Factors--Distillate Oil

Number of Payments	Beneficial Occupancy Date									
	Oct 1994	Oct 1995	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003
1	0.9709	0.9474	0.9317	0.9215	0.9162	0.9145	0.9130	0.9115	0.9078	0.8961
2	1.9183	1.8791	1.8532	1.8376	1.8307	1.8275	1.8245	1.8193	1.8040	1.7768
3	2.8500	2.8005	2.7693	2.7521	2.7437	2.7391	2.7324	2.7155	2.6846	2.6428
4	3.7714	3.7167	3.6838	3.6652	3.6552	3.6469	3.6285	3.5961	3.5507	3.4970
5	4.6876	4.6312	4.5969	4.5767	4.5630	4.5430	4.5092	4.4622	4.4048	4.3418
6	5.6021	5.5442	5.5084	5.4845	5.4592	5.4237	5.3752	5.3163	5.2497	5.1778
7	6.5151	6.4557	6.4162	6.3806	6.3398	6.2897	6.2294	6.1612	6.0857	6.0047
8	7.4267	7.3636	7.3123	7.2613	7.2059	7.1439	7.0742	6.9972	6.9126	6.8170
9	8.3345	8.2597	8.1930	8.1273	8.0600	7.9887	7.9102	7.8241	7.7248	7.6094
10	9.2306	9.1404	9.0590	8.9815	8.9049	8.8247	8.7371	8.6363	8.5172	8.3831
11	10.1113	10.0064	9.9132	9.8263	9.7409	9.6516	9.5493	9.4287	9.2909	9.1384
12	10.9773	10.8606	10.7581	10.6623	10.5678	10.4638	10.3418	10.2024	10.0462	9.8758
13	11.8315	11.7054	11.5940	11.4892	11.3800	11.2563	11.1154	10.9578	10.7836	10.5956
14	12.6763	12.5414	12.4209	12.3015	12.1724	12.0300	11.8708	11.6951	11.5035	11.2978
15	13.5123	13.3683	13.2332	13.0939	12.9461	12.7853	12.6082	12.4150	12.2056	11.9832
16	14.3392	14.1805	14.0256	13.8676	13.7015	13.5227	13.3280	13.1172	12.8910	12.6527
17	15.1514	14.9730	14.7993	14.6229	14.4388	14.2425	14.0302	13.8026	13.5605	13.3061
18	15.9439	15.7467	15.5546	15.3603	15.1587	14.9447	14.7156	14.4720	14.2140	13.9439
19	16.7176	16.5020	16.2920	16.0801	15.8609	15.6301	15.3851	15.1255	14.8517	14.5663
20	17.4729	17.2394	17.0118	16.7823	16.5463	16.2996	16.0385	15.7633	15.4742	15.1738
21	18.2103	17.9592	17.7140	17.4677	17.2157	16.9530	16.6763	16.3857	16.0816	15.7670
22	18.9301	18.6614	18.3994	18.1372	17.8692	17.5908	17.2987	16.9931	16.6748	16.3459
23	19.6323	19.3468	19.0689	18.7906	18.5069	18.2132	17.9062	17.5863	17.2537	16.9108
24	20.3177	20.0163	19.7224	19.4284	19.1294	18.8207	18.4994	18.1652	17.8186	17.4623
25	20.9872	20.6697	20.3601	20.0508	19.7368	19.4139	19.0782	18.7301	18.3702	18.0009
30	24.1015	23.7095	23.3270	22.9468	22.5639	22.1736	21.7720	21.3595	20.9364	20.5050
35	26.8612	26.4033	25.9564	25.5130	25.0680	24.6168	24.1558	23.6853	23.2055	22.7189
40	29.3044	28.7870	28.2821	27.7822	27.2820	26.7768	26.2633	25.7415	25.2117	24.6763
45	31.4644	30.8945	30.3383	29.7883	29.2393	28.6865	28.1265	27.5594	26.9853	26.4068
50	33.3741	32.7577	32.1562	31.5620	30.9698	30.3749	29.7738	29.1666	28.5535	27.9367

Notes: <1> Data Based on Assumed DOS of Apr 1994.
              Authorized Period of Use of Table is Oct 1993 through Sep 1994.
         <2> Tabulated Data Based on Criteria Contained in 18 Mar 91 Tri-Service Memorandum
              of Agreement on Criteria/Standards for EA/LCC for MILCON Design.
              Data Based on Discount Rate of 3.1% and DOE Projections of Future Price Level Changes
              for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1993).
         <3> Region 4: MT, ID, WY, CO, NM, AZ, UT, NV, WA, OR, CA, AK, HI

Table E-3-RO-4. Present Worth Factors--Residual Oil

Number of Payments	Beneficial Occupancy Date									
	Oct 1994	Oct 1995	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003
1	1.0026	0.9943	0.9837	0.9839	0.9908	1.0023	1.0137	1.0249	1.0332	1.0284
2	1.9969	1.9780	1.9676	1.9747	1.9931	2.0160	2.0386	2.0581	2.0616	2.0436
3	2.9807	2.9619	2.9585	2.9770	3.0069	3.0409	3.0718	3.0865	3.0768	3.0480
4	3.9646	3.9527	3.9608	3.9908	4.0317	4.0742	4.1002	4.1017	4.0812	4.0447
5	4.9554	4.9550	4.9745	5.0157	5.0650	5.1025	5.1155	5.1061	5.0780	5.0370
6	5.9577	5.9688	5.9994	6.0489	6.0934	6.1178	6.1198	6.1028	6.0702	6.0263
7	6.9714	6.9937	7.0326	7.0773	7.1086	7.1221	7.1166	7.0951	7.0595	7.0131
8	7.9963	8.0269	8.0610	8.0925	8.1129	8.1189	8.1088	8.0844	8.0463	7.9934
9	9.0295	9.0553	9.0762	9.0968	9.1097	9.1111	9.0981	9.0712	9.0266	8.9637
10	10.0579	10.0705	10.0806	10.0936	10.1019	10.1004	10.0849	10.0515	9.9970	9.9248
11	11.0732	11.0748	11.0774	11.0858	11.0913	11.0872	11.0653	11.0219	10.9580	10.8761
12	12.0775	12.0716	12.0696	12.0752	12.0780	12.0676	12.0356	11.9829	11.9093	11.8176
13	13.0743	13.0639	13.0589	13.0619	13.0584	13.0379	12.9966	12.9342	12.8508	12.7497
14	14.0665	14.0532	14.0457	14.0423	14.0287	13.9989	13.9480	13.8757	13.7830	13.6723
15	15.0558	15.0399	15.0260	15.0126	14.9897	14.9503	14.8894	14.8078	14.7055	14.5851
16	16.0426	16.0203	15.9964	15.9736	15.9411	15.8917	15.8216	15.7304	15.6183	15.4885
17	17.0230	16.9906	16.9574	16.9250	16.8825	16.8239	16.7442	16.6432	16.5218	16.3833
18	17.9933	17.9516	17.9087	17.8664	17.8147	17.7465	17.6569	17.5467	17.4165	17.2690
19	18.9543	18.9030	18.8502	18.7986	18.7373	18.6592	18.5604	18.4414	18.3023	18.1455
20	19.9057	19.8445	19.7823	19.7212	19.6500	19.5627	19.4551	19.3272	19.1787	19.0132
21	20.8471	20.7766	20.7049	20.6339	20.5535	20.4575	20.3409	20.2036	20.0464	19.8718
22	21.7793	21.6992	21.6177	21.5374	21.4483	21.3432	21.2173	21.0713	20.9050	20.7218
23	22.7019	22.6120	22.5212	22.4322	22.3340	22.2197	22.0850	21.9299	21.7550	21.5635
24	23.6146	23.5154	23.4159	23.3179	23.2105	23.0873	22.9436	22.7799	22.5968	22.3969
25	24.5181	24.4102	24.3017	24.1944	24.0781	23.9459	23.7936	23.6217	23.4301	23.2215
30	28.9013	28.7486	28.5962	28.4457	28.2864	28.1118	27.9178	27.7044	27.4720	27.2234
35	33.0672	32.8728	32.6789	32.4876	32.2884	32.0746	31.8417	31.5899	31.3194	31.0332
40	37.0300	36.7968	36.5644	36.3350	36.0981	35.8470	35.5772	35.2887	34.9820	34.6599
45	40.8024	40.5322	40.2632	39.9976	39.7248	39.4382	39.1331	38.8098	38.4686	38.1123
50	44.3936	44.0882	43.7843	43.4843	43.1773	42.8568	42.5183	42.1618	41.7877	41.3989

Notes:
<1> Data Based on Assumed DOS of Apr 1994.
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<2> Tabulated Data Based on Criteria Contained in 18 Mar 91 Tri-Service Memorandum of Agreement on Criteria/Standards for EA/LCC for MILCON Design.
Data Based on Discount Rate of 3.1% and DOE Projections of Future Price Level Changes for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1993).

<3> Region 4: MT, ID, WY, CO, NM, AZ, UT, NV, WA, OR, CA, AK, HI

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Table E-3-NG-4. Present Worth Factors--Natural Gas

Number of Payments	Oct 1994	Oct 1995	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003
1	1.0000	0.9941	0.9784	0.9715	0.9702	0.9740	0.9802	0.9884	1.0006	1.0072
2	1.9942	1.9725	1.9499	1.9418	1.9443	1.9543	1.9686	1.9890	2.0078	2.0095
3	2.9726	2.9440	2.9202	2.9158	2.9245	2.9427	2.9693	2.9962	3.0101	2.9983
4	3.9441	3.9143	3.8942	3.8960	3.9129	3.9433	3.9765	3.9985	3.9990	3.9718
5	4.9143	4.8883	4.8744	4.8844	4.9135	4.9505	4.9787	4.9874	4.9724	4.9316
6	5.8884	5.8685	5.8628	5.8850	5.9207	5.9528	5.9676	5.9608	5.9322	5.8689
7	6.8686	6.8569	6.8635	6.8922	6.9230	6.9416	6.9410	6.9206	6.8695	6.7806
8	7.8570	7.8576	7.8707	7.8945	7.9119	7.9150	7.9009	7.8579	7.7812	7.6800
9	8.8576	8.8648	8.8729	8.8834	8.8853	8.8749	8.8382	8.7696	8.6806	8.5753
10	9.8648	9.8671	9.8618	9.8568	9.8451	9.8122	9.7499	9.6690	9.5759	9.4666
11	10.8671	10.8559	10.8352	10.8167	10.7824	10.7239	10.6493	10.5643	10.4672	10.3534
12	11.8560	11.8293	11.7951	11.7539	11.6941	11.6233	11.5445	11.4556	11.3541	11.2367
13	12.8294	12.7892	12.7324	12.6656	12.5936	12.5185	12.4359	12.3425	12.2374	12.1159
14	13.7892	13.7265	13.6441	13.5651	13.4888	13.4099	13.3227	13.2257	13.1165	12.9911
15	14.7265	14.6382	14.5435	14.4603	14.3801	14.2967	14.2060	14.1049	13.9917	13.8624
16	15.6382	15.5376	15.4387	15.3516	15.2670	15.1800	15.0852	14.9801	14.8631	14.7294
17	16.5376	16.4328	16.3301	16.2385	16.1503	16.0592	15.9603	15.8515	15.7300	15.5926
18	17.4329	17.3242	17.2169	17.1218	17.0294	16.9344	16.8317	16.7184	16.5933	16.4523
19	18.3242	18.2110	18.1002	18.0009	17.9046	17.8057	17.6986	17.5817	17.4529	17.3078
20	19.2110	19.0943	18.9794	18.8761	18.7760	18.6726	18.5619	18.4413	18.3085	18.1575
21	20.0943	19.9735	19.8545	19.7475	19.6429	19.5359	19.4216	19.2969	19.1582	18.9936
22	20.9735	20.8487	20.7259	20.6144	20.5062	20.3956	20.2771	20.1466	19.9943	19.8095
23	21.8487	21.7200	21.5928	21.4777	21.3659	21.2511	21.1268	20.9827	20.8102	20.6057
24	22.7200	22.5869	22.4561	22.3374	22.2214	22.1008	21.9629	21.7986	21.6063	21.3831
25	23.5870	23.4502	23.3158	23.1929	23.0711	22.9369	22.7788	22.5947	22.3837	22.1421
30	27.8512	27.6671	27.4692	27.2681	27.0557	26.8265	26.5755	26.3008	26.0006	25.6715
35	31.7408	31.4638	31.1752	30.8851	30.5851	30.2700	29.9353	29.5787	29.1989	28.7919
40	35.1844	34.8236	34.4532	34.0833	33.7055	33.3145	32.9056	32.4768	32.0264	31.5507
45	38.2288	37.7939	37.3512	36.9108	36.4642	36.0061	35.5318	35.0390	34.5263	33.9897
50	40.9204	40.4201	39.9135	39.4107	38.9033	38.3858	37.8535	37.3043	36.7365	36.1461

Beneficial Occupancy Date

Notes: <1> Data Based on Assumed DOS of Apr 1994.
Authorized Period of Use of Table is Oct 1993 through Sep 1994.
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Data Based on Discount Rate of 3.1% and DOE Projections of Future Price Level Changes
for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1993).
<3> Region 4: MT, ID, WY, CO, NM, AZ, UT, NV, WA, OR, CA, AK, HI

Table E-3-SC-4. Present Worth Factors--Steam Coal

Number of Payments	Beneficial Occupancy Date									
	Oct 1994	Oct 1995	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003
1	0.9810	0.9622	0.9471	0.9322	0.9171	0.9086	0.8936	0.8727	0.8551	0.8378
2	1.9432	1.9094	1.8793	1.8493	1.8257	1.8021	1.7662	1.7277	1.6928	1.6558
3	2.8903	2.8415	2.7964	2.7579	2.7193	2.6748	2.6213	2.5655	2.5109	2.4623
4	3.8225	3.7587	3.7050	3.6514	3.5919	3.5299	3.4591	3.3835	3.3174	3.2626
5	4.7396	4.6672	4.5986	4.5241	4.4470	4.3676	4.2771	4.1901	4.1176	4.0536
6	5.6482	5.5608	5.4712	5.3792	5.2848	5.1857	5.0836	4.9903	4.9087	4.8329
7	6.5418	6.4334	6.3263	6.2169	6.1028	5.9922	5.8839	5.7813	5.6880	5.6004
8	7.4144	7.2885	7.1641	7.0350	6.9093	6.7924	6.6749	6.5606	6.4555	6.3584
9	8.2695	8.1263	7.9821	7.8415	7.7096	7.5835	7.4542	7.3281	7.2135	7.1046
10	9.1073	8.9443	8.7886	8.6417	8.5006	8.3628	8.2217	8.0862	7.9597	7.8369
11	9.9253	9.7509	9.5888	9.4328	9.2799	9.1303	8.9797	8.8324	8.6920	8.5575
12	10.7318	10.5511	10.3799	10.2121	10.0474	9.8883	9.7259	9.5647	9.4126	9.2665
13	11.5320	11.3421	11.1592	10.9796	10.8054	10.6345	10.4582	10.2852	10.1215	9.9638
14	12.3231	12.1214	11.9267	11.7376	11.5516	11.3668	11.1788	10.9942	10.8189	10.6496
15	13.1024	12.8889	12.6847	12.4838	12.2839	12.0874	11.8878	11.6915	11.5047	11.3239
16	13.8699	13.6469	13.4309	13.2161	13.0045	12.7963	12.5851	12.3773	12.1789	11.9868
17	14.6279	14.3932	14.1632	13.9367	13.7135	13.4936	13.2709	13.0516	12.8418	12.6383
18	15.3741	15.1254	14.8838	14.6456	14.4108	14.1794	13.9452	13.7145	13.4934	13.2786
19	16.1064	15.8460	15.5927	15.3429	15.0966	14.8537	14.6081	14.3661	14.1337	13.9078
20	16.8270	16.5550	16.2901	16.0287	15.7709	15.5166	15.2596	15.0064	14.7628	14.5274
21	17.5359	17.2523	16.9759	16.7030	16.4338	16.1682	15.8999	15.6355	15.3825	15.1375
22	18.2333	17.9381	17.6502	17.3659	17.0853	16.8085	16.5291	16.2551	15.9926	15.7367
23	18.9191	18.6124	18.3131	18.0175	17.7256	17.4376	17.1487	16.8652	16.5918	16.3250
24	19.5934	19.2753	18.9646	18.6578	18.3548	18.0572	17.7588	17.4644	17.1801	16.9039
25	20.2563	19.9268	19.6049	19.2869	18.9744	18.6674	18.3580	18.0527	17.7590	17.4735
30	23.4070	23.0252	22.6513	22.2831	21.9205	21.5637	21.2062	20.8547	20.5151	20.1842
35	26.3034	25.8735	25.4532	25.0391	24.6312	24.2297	23.8282	23.4334	23.0512	22.6785
40	28.9693	28.4954	28.0319	27.5753	27.1255	26.6828	26.2408	25.8062	25.3849	24.9737
45	31.4224	30.9081	30.4047	29.9089	29.4207	28.9401	28.4609	27.9896	27.5322	27.0856
50	33.6797	33.1281	32.5881	32.0563	31.5326	31.0172	30.5037	29.9987	29.5082	29.0290

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Data Based on Discount Rate of 3.1% and DOE Projections of Future Price Level Changes
for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1993).
<3> Region 4: MT, ID, WY, CO, NM, AZ, UT, NV, WA, OR, CA, AK, HI

Table E-3-LP-4. Present Worth Factors—Liquefied Petroleum Gas (LPG)

Number of Payments	Beneficial Occupancy Date									
	Oct 1994	Oct 1995	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003
1	0.9577	0.9258	0.9057	0.8892	0.8757	0.8649	0.8547	0.8444	0.8332	0.8178
2	1.8835	1.8315	1.7948	1.7648	1.7405	1.7196	1.6991	1.6776	1.6510	1.6177
3	2.7892	2.7207	2.6705	2.6297	2.5953	2.5640	2.5323	2.4954	2.4509	2.4010
4	3.6784	3.5963	3.5354	3.4844	3.4396	3.3972	3.3501	3.2953	3.2342	3.1695
5	4.5540	4.4612	4.3901	4.3288	4.2728	4.2150	4.1500	4.0785	4.0027	3.9246
6	5.4189	5.3159	5.2345	5.1620	5.0906	5.0149	4.9333	4.8471	4.7578	4.6668
7	6.2736	6.1603	6.0677	5.9798	5.8905	5.7981	5.7018	5.6022	5.5000	5.3962
8	7.1180	6.9935	6.8855	6.7797	6.6738	6.5667	6.4569	6.3444	6.2294	6.1094
9	7.9512	7.8113	7.6854	7.5630	7.4423	7.3218	7.1991	7.0738	6.9426	6.8037
10	8.7690	8.6112	8.4686	8.3315	8.1975	8.0640	7.9285	7.7870	7.6369	7.4794
11	9.5689	9.3945	9.2372	9.0866	8.9397	8.7934	8.6417	8.4813	8.3126	8.1369
12	10.3522	10.1630	9.9923	9.8289	9.6690	9.5066	9.3360	9.1570	8.9700	8.7765
13	11.1207	10.9182	10.7345	10.5582	10.3823	10.2009	10.0117	9.8144	9.6097	9.3990
14	11.8759	11.6604	11.4639	11.2715	11.0765	10.8766	10.6691	10.4541	10.2322	10.0049
15	12.6181	12.3897	12.1771	11.9657	11.7522	11.5340	11.3088	11.0766	10.8381	10.5944
16	13.3474	13.1030	12.8714	12.6414	12.4097	12.1737	11.9313	11.6825	11.4276	11.1679
17	14.0607	13.7972	13.5471	13.2989	13.0493	12.7962	12.5372	12.2720	12.0011	11.7261
18	14.7549	14.4729	14.2045	13.9385	13.6719	13.4021	13.1267	12.8455	12.5593	12.2693
19	15.4306	15.1304	14.8442	14.5610	14.2778	13.9916	13.7002	13.4037	13.1025	12.7978
20	16.0881	15.7700	15.4667	15.1670	14.8673	14.5651	14.2584	13.9469	13.6310	13.3121
21	16.7277	16.3925	16.0726	15.7564	15.4408	15.1233	14.8016	14.4754	14.1453	13.8127
22	17.3502	16.9985	16.6621	16.3300	15.9989	15.6665	15.3301	14.9897	14.6459	14.2996
23	17.9562	17.5880	17.2356	16.8881	16.5422	16.1950	15.8444	15.4903	15.1328	14.7735
24	18.5457	18.1615	17.7938	17.4313	17.0707	16.7093	16.3450	15.9772	15.6067	15.2347
25	19.1192	18.7196	18.3370	17.9598	17.5850	17.2099	16.8319	16.4511	16.0679	15.6835
30	21.7639	21.2931	20.8412	20.3967	19.9563	19.5174	19.0775	18.6364	18.1945	17.7530
35	24.0714	23.5388	23.0265	22.5233	22.0258	21.5313	21.0374	20.5436	20.0505	19.5591
40	26.0854	25.4986	24.9337	24.3793	23.8319	23.2889	22.7477	22.2080	21.6702	21.1353
45	27.8429	27.2089	26.5981	25.9990	25.4081	24.8228	24.2404	23.6606	23.0837	22.5109
50	29.3768	28.7016	28.0507	27.4125	26.7837	26.1614	25.5431	24.9283	24.3174	23.7114

Notes: <1> Data Based on Assumed DOS of Apr 1994.
Authorized Period of Use of Table is Oct 1993 through Sep 1994.
<2> Tabulated Data Based on Criteria Contained in 18 Mar 91 Tri-Service Memorandum
of Agreement on Criteria/Standards for EA/LCC for MILCON Design.
Data Based on Discount Rate of 3.1% and DOE Projections of Future Price Level Changes
for Residential Sector (NIST Annual Supplement to Handbook 135, Oct 1993).
<3> Region 4: MT, ID, WY, CO, NM, AZ, UT, NV, WA, OR, CA, AK, HI

Table E-3-EL-5. Present Worth Factors--Electricity

Number of Payments	Beneficial Occupancy Date									
	Oct 1994	Oct 1995	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003
1	0.9726	0.9446	0.9162	0.8919	0.8706	0.8532	0.8350	0.8141	0.7953	0.7779
2	1.9172	1.8608	1.8081	1.7626	1.7239	1.6882	1.6491	1.6094	1.5732	1.5365
3	2.8333	2.7527	2.6788	2.6158	2.5588	2.5023	2.4443	2.3873	2.3318	2.2741
4	3.7253	3.6234	3.5320	3.4508	3.3729	3.2976	3.2222	3.1459	3.0694	2.9915
5	4.5959	4.4766	4.3670	4.2649	4.1682	4.0754	3.9808	3.8835	3.7868	3.6892
6	5.4491	5.3115	5.1811	5.0601	4.9461	4.8340	4.7185	4.6009	4.4845	4.3655
7	6.2841	6.1256	5.9763	5.8380	5.7047	5.5717	5.4358	5.2986	5.1608	5.0215
8	7.0982	6.9209	6.7542	6.5966	6.4424	6.2890	6.1336	5.9749	5.8168	5.6602
9	7.8935	7.6988	7.5128	7.3343	7.1597	6.9868	6.8099	6.6309	6.4555	6.2819
10	8.6714	8.4574	8.2505	8.0516	7.8574	7.6631	7.4659	7.2696	7.0771	6.8869
11	9.4300	9.1951	8.9678	8.7494	8.5337	8.3191	8.1046	7.8912	7.6822	7.4758
12	10.1676	9.9124	9.6655	9.4257	9.1897	8.9578	8.7262	8.4963	8.2710	8.0489
13	10.8850	10.6101	10.3419	10.0817	9.8284	9.5794	9.3312	9.0852	8.8442	8.6067
14	11.5827	11.2865	10.9979	10.7204	10.4501	10.1845	9.9201	9.6583	9.4020	9.1496
15	12.2590	11.9425	11.6366	11.3420	11.0551	10.7733	10.4932	10.2161	9.9448	9.6781
16	12.9150	12.5812	12.2582	11.9470	11.6440	11.3464	11.0510	10.7589	10.4734	10.1924
17	13.5537	13.2028	12.8632	12.5359	12.2171	11.9042	11.5939	11.2875	10.9877	10.6930
18	14.1754	13.8078	13.4521	13.1090	12.7749	12.4471	12.1224	11.8018	11.4883	11.1803
19	14.7804	14.3967	14.0252	13.6668	13.3178	12.9756	12.6368	12.3024	11.9756	11.6547
20	15.3693	14.9698	14.5830	14.2097	13.8463	13.4900	13.1373	12.7897	12.4500	12.1163
21	15.9424	15.5276	15.1259	14.7382	14.3606	13.9906	13.6246	13.2641	12.9116	12.5656
22	16.5002	16.0705	15.6544	15.2526	14.8612	14.4779	14.0990	13.7257	13.3609	13.0030
23	17.0431	16.5990	16.1688	15.7531	15.3485	14.9522	14.5607	14.1750	13.7982	13.4287
24	17.5716	17.1134	16.6693	16.2404	15.8229	15.4139	15.0100	14.6123	14.2240	13.8431
25	18.0859	17.6139	17.1566	16.7148	16.2845	15.8632	15.4473	15.0381	14.6384	14.2464
30	20.4591	19.9239	19.4050	18.9032	18.4146	17.9363	17.4651	17.0020	16.5498	16.1068
35	22.5323	21.9417	21.3689	20.8146	20.2750	19.7472	19.2278	18.7177	18.2199	17.7324
40	24.3432	23.7044	23.0847	22.4848	21.9007	21.3296	20.7681	20.2170	19.6793	19.1530
45	25.9256	25.2447	24.5840	23.9442	23.3212	22.7124	22.1141	21.5272	20.9546	20.3943
50	27.3083	26.5906	25.8941	25.2194	24.5625	23.9207	23.2902	22.6720	22.0689	21.4790

Notes: <1> Data Based on Assumed DOS of Apr 1994.
             Authorized Period of Use of Table is Oct 1993 through Sep 1994.
        <2> Tabulated Data Based on Criteria Contained in 18 Mar 91 Tri-Service Memorandum
             of Agreement on Criteria/Standards for EA/LCC for MILCON Design.
             Data Based on Discount Rate of 3.1% and DOE Projections of Future Price Level Changes
             for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1993).

Table E-3-DO-5. Present Worth Factors--Distillate Oil

Number of Payments	Beneficial Occupancy Date									
	Oct 1994	Oct 1995	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003
1	0.9709	0.9474	0.9318	0.9216	0.9164	0.9148	0.9134	0.9120	0.9084	0.8968
2	1.9183	1.8792	1.8534	1.8380	1.8312	1.8283	1.8255	1.8205	1.8052	1.7781
3	2.8501	2.8008	2.7698	2.7528	2.7447	2.7403	2.7339	2.7172	2.6865	2.6448
4	3.7717	3.7172	3.6846	3.6663	3.6567	3.6488	3.6307	3.5986	3.5533	3.4997
5	4.6881	4.6320	4.5981	4.5783	4.5651	4.5455	4.5120	4.4653	4.4082	4.3454
6	5.6029	5.5455	5.5101	5.4867	5.4619	5.4269	5.3787	5.3202	5.2538	5.1822
7	6.5164	6.4575	6.4185	6.3835	6.3432	6.2936	6.2336	6.1658	6.0906	6.0099
8	7.4284	7.3659	7.3153	7.2648	7.2100	7.1485	7.0793	7.0026	6.9184	6.8230
9	8.3368	8.2627	8.1966	8.1316	8.0649	7.9941	7.9161	7.8304	7.7315	7.6163
10	9.2336	9.1440	9.0634	8.9865	8.9105	8.8309	8.7438	8.6435	8.5248	8.3909
11	10.1149	10.0108	9.9183	9.8321	9.7473	9.6587	9.5569	9.4368	9.2993	9.1471
12	10.9817	10.8657	10.7639	10.6689	10.5751	10.4718	10.3503	10.2114	10.0555	9.8853
13	11.8366	11.7113	11.6007	11.4967	11.3882	11.2651	11.1248	10.9675	10.7937	10.6060
14	12.6822	12.5481	12.4285	12.3098	12.1815	12.0396	11.8810	11.7058	11.5144	11.3090
15	13.5190	13.3759	13.2416	13.1031	12.9560	12.7958	12.6192	12.4265	12.2174	11.9952
16	14.3468	14.1890	14.0349	13.8776	13.7122	13.5341	13.3399	13.1295	12.9037	12.6651
17	15.1599	14.9823	14.8094	14.6338	14.4505	14.2547	14.0429	13.8157	13.5735	13.3189
18	15.9532	15.7568	15.5656	15.3721	15.1711	14.9578	14.7291	14.4855	14.2273	13.9574
19	16.7277	16.5130	16.3039	16.0927	15.8741	15.6440	15.3990	15.1393	14.8659	14.5807
20	17.4839	17.2512	17.0245	16.7957	16.5604	16.3138	16.0528	15.7779	15.4891	15.1889
21	18.2222	17.9719	17.7275	17.4820	17.2302	16.9676	16.6913	16.4011	16.0973	15.7829
22	18.9428	18.6749	18.4138	18.1518	17.8840	17.6062	17.3146	17.0094	16.6913	16.3625
23	19.6458	19.3612	19.0836	18.8056	18.5226	18.2294	17.9228	17.6034	17.2710	16.9282
24	20.3321	20.0310	19.7374	19.4442	19.1458	18.8377	18.5168	18.1830	17.8366	17.4805
25	21.0019	20.6848	20.3760	20.0674	19.7541	19.4316	19.0964	18.7486	18.3889	18.0198
30	24.1197	23.7285	23.3467	22.9672	22.5849	22.1947	21.7933	21.3807	20.9574	20.5259
35	26.8828	26.4253	25.9788	25.5358	25.0910	24.6399	24.1789	23.7084	23.2285	22.7417
40	29.3279	28.8110	28.3065	27.8068	27.3068	26.8018	26.2883	25.7664	25.2365	24.7008
45	31.4899	30.9203	30.3645	29.8148	29.2660	28.7133	28.1533	27.5861	27.0119	26.4331
50	33.4014	32.7853	32.1842	31.5902	30.9982	30.4034	29.8023	29.1950	28.5817	27.9647

Notes: <1> Data Based on Assumed DOS of Apr 1994.
Authorized Period of Use of Table is Oct 1993 through Sep 1994.

<2> Tabulated Data Based on Criteria Contained in 18 Mar 91 Tri-Service Memorandum
of Agreement on Criteria/Standards for EA/LCC for MILCON Design.
Data Based on Discount Rate of 3.1% and DOE Projections of Future Price Level Changes
for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1993).

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Table E-3-RO-5. Present Worth Factors--Residual Oil

Number of Payments	Beneficial Occupancy Date									
	Oct 1994	Oct 1995	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003
1	1.0015	0.9940	0.9844	0.9836	0.9878	0.9965	1.0080	1.0193	1.0252	1.0184
2	1.9956	1.9785	1.9680	1.9713	1.9843	2.0045	2.0273	2.0445	2.0436	2.0233
3	2.9800	2.9620	2.9557	2.9678	2.9923	3.0238	3.0525	3.0629	3.0485	3.0170
4	3.9635	3.9498	3.9522	3.9759	4.0116	4.0490	4.0709	4.0678	4.0422	4.0027
5	4.9513	4.9463	4.9603	4.9952	5.0368	5.0674	5.0758	5.0615	5.0279	4.9833
6	5.9478	5.9543	5.9796	6.0203	6.0552	6.0723	6.0695	6.0472	6.0084	5.9604
7	6.9558	6.9736	7.0048	7.0387	7.0601	7.0660	7.0552	7.0277	6.9855	6.9343
8	7.9751	7.9988	8.0232	8.0437	8.0538	8.0517	8.0358	8.0048	7.9595	7.9025
9	9.0003	9.0172	9.0281	9.0373	9.0395	9.0323	9.0129	8.9788	8.9277	8.8614
10	10.0187	10.0221	10.0218	10.0230	10.0200	10.0094	9.9868	9.9470	9.8865	9.8105
11	11.0236	11.0158	11.0074	11.0036	10.9971	10.9833	10.9550	10.9058	10.8357	10.7498
12	12.0173	12.0015	11.9880	11.9807	11.9711	11.9515	11.9139	11.8550	11.7750	11.6797
13	13.0030	12.9821	12.9651	12.9547	12.9393	12.9104	12.8630	12.7942	12.7049	12.6001
14	13.9836	13.9592	13.9391	13.9228	13.8981	13.8595	13.8023	13.7242	13.6252	13.5106
15	14.9607	14.9331	14.9073	14.8817	14.8473	14.7988	14.7322	14.6445	14.5357	14.4118
16	15.9347	15.9013	15.8661	15.8309	15.7865	15.7287	15.6526	15.5550	15.4370	15.3043
17	16.9028	16.8601	16.8153	16.7701	16.7165	16.6491	16.5631	16.4563	16.3295	16.1877
18	17.8617	17.8093	17.7545	17.7000	17.6368	17.5596	17.4643	17.3487	17.2129	17.0619
19	18.8108	18.7486	18.6845	18.6204	18.5473	18.4608	18.3568	18.2322	18.0871	17.9273
20	19.7501	19.6785	19.6048	19.5309	19.4486	19.3533	19.2402	19.1064	18.9525	18.7843
21	20.6800	20.5989	20.5153	20.4321	20.3411	20.2367	20.1144	19.9718	19.8095	19.6327
22	21.6004	21.5094	21.4165	21.3246	21.2245	21.1109	20.9798	20.8288	20.6579	20.4722
23	22.5109	22.4106	22.3090	22.2081	22.0987	21.9763	21.8368	21.6771	21.4973	21.3032
24	23.4121	23.3031	23.1925	23.0822	22.9641	22.8333	22.6852	22.5166	22.3283	22.1261
25	24.3046	24.1865	24.0667	23.9476	23.8211	23.6817	23.5247	23.3476	23.1512	22.9406
30	28.6330	28.4710	28.3079	28.1464	27.9774	27.7955	27.5973	27.3799	27.1436	26.8941
35	32.7468	32.5436	32.3401	32.1388	31.9308	31.7113	31.4757	31.2212	30.9484	30.6625
40	36.6626	36.4219	36.1815	35.9435	35.6993	35.4437	35.1725	34.8828	34.5750	34.2545
45	40.3950	40.1188	39.8431	39.5701	39.2913	39.0015	38.6963	38.3730	38.0319	37.6784
50	43.9528	43.6426	43.3333	43.0270	42.7152	42.3927	42.0552	41.6998	41.3270	40.9420

Notes: <1> Data Based on Assumed DOS of Apr 1994.
Authorized Period of Use of Table is Oct 1993 through Sep 1994.

<2> Tabulated Data Based on Criteria Contained in 18 Mar 91 Tri-Service Memorandum
of Agreement on Criteria/Standards for EA/LCC for MILCON Design.
Data Based on Discount Rate of 3.1% and DOE Projections of Future Price Level Changes
for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1993).

ENERGY STUDIES: U.S. AVERAGE

Table E-3-NG-5. Present Worth Factors--Natural Gas

Number of Payments	Beneficial Occupancy Date									
	Oct 1994	Oct 1995	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003
1	1.0055	1.0041	0.9899	0.9855	0.9902	1.0003	1.0129	1.0263	1.0440	1.0575
2	2.0096	1.9940	1.9755	1.9758	1.9906	2.0133	2.0392	2.0703	2.1015	2.1154
3	2.9995	2.9795	2.9657	2.9761	3.0035	3.0395	3.0832	3.1278	3.1594	3.1615
4	3.9850	3.9698	3.9660	3.9890	4.0298	4.0835	4.1407	4.1857	4.2055	4.1922
5	4.9753	4.9701	4.9790	5.0153	5.0738	5.1411	5.1986	5.2317	5.2362	5.2097
6	5.9756	5.9830	6.0052	6.0593	6.1313	6.1989	6.2447	6.2625	6.2537	6.2047
7	6.9885	7.0093	7.0492	7.1168	7.1892	7.2450	7.2754	7.2800	7.2487	7.1728
8	8.0148	8.0533	8.1068	8.1747	8.2352	8.2757	8.2929	8.2750	8.2168	8.1279
9	9.0588	9.1108	9.1646	9.2208	9.2660	9.2932	9.2879	9.2431	9.1719	9.0791
10	10.1163	10.1687	10.2107	10.2515	10.2835	10.2883	10.2560	10.1981	10.1231	10.0269
11	11.1742	11.2148	11.2414	11.2690	11.2785	11.2563	11.2111	11.1494	11.0709	10.9705
12	12.2203	12.2455	12.2589	12.2640	12.2466	12.2114	12.1623	12.0972	12.0145	11.9093
13	13.2510	13.2630	13.2540	13.2321	13.2016	13.1627	13.1101	13.0408	12.9533	12.8436
14	14.2685	14.2580	14.2220	14.1872	14.1529	14.1104	14.0537	13.9796	13.8876	13.7728
15	15.2635	15.2261	15.1771	15.1384	15.1007	15.0540	14.9925	14.9139	14.8168	14.6964
16	16.2316	16.1811	16.1284	16.0862	16.0442	15.9928	15.9268	15.8431	15.7404	15.6138
17	17.1866	17.1324	17.0761	17.0298	16.9831	16.9271	16.8560	16.7666	16.6578	16.5225
18	18.1379	18.0802	18.0197	17.9686	17.9174	17.8563	17.7796	17.6841	17.5665	17.4207
19	19.0857	19.0238	18.9585	18.9029	18.8466	18.7799	18.6970	18.5928	18.4647	18.3089
20	20.0293	19.9626	19.8928	19.8321	19.7701	19.6973	19.6057	19.4910	19.3529	19.1875
21	20.9681	20.8969	20.8220	20.7557	20.6876	20.6060	20.5039	20.3792	20.2315	20.0552
22	21.9024	21.8261	21.7456	21.6731	21.5962	21.5042	21.3921	21.2578	21.0992	20.9104
23	22.8316	22.7497	22.6630	22.5818	22.4944	22.3924	22.2707	22.1254	21.9544	21.7531
24	23.7552	23.6671	23.5717	23.4800	23.3826	23.2711	23.1384	22.9806	22.7971	22.5839
25	24.6726	24.5758	24.4699	24.3682	24.2613	24.1387	23.9936	23.8234	23.6279	23.4034
30	29.1139	28.9636	28.8023	28.6432	28.4771	28.2949	28.0916	27.8649	27.6142	27.3352
35	33.2702	33.0617	32.8439	32.6295	32.4089	32.1733	31.9174	31.6387	31.3368	31.0072
40	37.1486	36.8875	36.6177	36.3521	36.0810	35.7955	35.4904	35.1632	34.8134	34.4367
45	40.7708	40.4605	40.1422	39.8287	39.5104	39.1784	38.8274	38.4549	38.0604	37.6396
50	44.1537	43.7975	43.4338	43.0757	42.7133	42.3378	41.9439	41.5291	41.0928	40.6308

Notes: <1> Data Based on Assumed DOS of Apr 1994.
Authorized Period of Use of Table is Oct 1993 through Sep 1994.
<2> Tabulated Data Based on Criteria Contained in 18 Mar 91 Tri-Service Memorandum
of Agreement on Criteria/Standards for EA/LCC for MILCON Design.
Data Based on Discount Rate of 3.1% and DOE Projections of Future Price Level Changes
for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1993).

Table E-3-SC-5. Present Worth Factors--Steam Coal

Number of Payments	Beneficial Occupancy Date									
	Oct 1994	Oct 1995	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003
1	0.9861	0.9752	0.9611	0.9411	0.9242	0.9158	0.9045	0.8877	0.8712	0.8548
2	1.9613	1.9364	1.9023	1.8653	1.8401	1.8203	1.7923	1.7589	1.7260	1.6935
3	2.9225	2.8775	2.8265	2.7812	2.7446	2.7081	2.6634	2.6138	2.5647	2.5230
4	3.8636	3.8017	3.7423	3.6857	3.6323	3.5793	3.5183	3.4524	3.3942	3.3434
5	4.7878	4.7176	4.6468	4.5734	4.5035	4.4341	4.3569	4.2819	4.2145	4.1499
6	5.7036	5.6221	5.5346	5.4446	5.3583	5.2727	5.1864	5.1023	5.0211	4.9469
7	6.6081	6.5098	6.4058	6.2994	6.1970	6.1023	6.0068	5.9088	5.8181	5.7343
8	7.4959	7.3810	7.2606	7.1381	7.0265	6.9226	6.8133	6.7059	6.6055	6.5100
9	8.3671	8.2358	8.0992	7.9676	7.8469	7.7292	7.6104	7.4933	7.3811	7.2738
10	9.2219	9.0745	8.9288	8.7880	8.6534	8.5262	8.3978	8.2689	8.1450	8.0259
11	10.0605	9.9040	9.7491	9.5945	9.4504	9.3136	9.1734	9.0328	8.8971	8.7644
12	10.8901	10.7244	10.5557	10.3915	10.2378	10.0892	9.9373	9.7848	9.6356	9.4895
13	11.7104	11.5309	11.3527	11.1789	11.0135	10.8531	10.6893	10.5234	10.3607	10.2030
14	12.5170	12.3279	12.1401	11.9546	11.7773	11.6052	11.4279	11.2485	11.0742	10.9050
15	13.3140	13.1153	12.9157	12.7184	12.5294	12.3437	12.1530	11.9620	11.7762	11.5955
16	14.1014	13.8910	13.6796	13.4705	13.2679	13.0688	12.8665	12.6639	12.4667	12.2745
17	14.8770	14.6548	14.4317	14.2090	13.9930	13.7823	13.5684	13.3544	13.1457	12.9422
18	15.6409	15.4069	15.1702	14.9341	14.7065	14.4843	14.2589	14.0335	13.8134	13.5985
19	16.3930	16.1454	15.8953	15.6477	15.4085	15.1748	14.9380	14.7011	14.4697	14.2437
20	17.1315	16.8705	16.6088	16.3496	16.0990	15.8538	15.6056	15.3575	15.1149	14.8777
21	17.8566	17.5840	17.3108	17.0401	16.7780	16.5215	16.2620	16.0026	15.7488	15.5006
22	18.5701	18.2860	18.0012	17.7191	17.4457	17.1778	16.9071	16.6366	16.3718	16.1138
23	19.2721	18.9765	18.6803	18.3868	18.1020	17.8229	17.5411	17.2595	16.9850	16.7174
24	19.9626	19.6555	19.3479	19.0432	18.7472	18.4569	18.1640	17.8728	17.5886	17.3102
25	20.6416	20.3232	20.0043	19.6883	19.3812	19.0799	18.7773	18.4764	18.1814	17.8934
30	23.8677	23.4948	23.1232	22.7548	22.3969	22.0463	21.6947	21.3450	21.0030	20.6685
35	26.8341	26.4122	25.9919	25.5764	25.1720	24.7755	24.3788	23.9848	23.5991	23.2217
40	29.5633	29.0963	28.6316	28.1725	27.7252	27.2866	26.8483	26.4135	25.9876	25.5707
45	32.0744	31.5659	31.0603	30.5611	30.0742	29.5968	29.1203	28.6480	28.1852	27.7320
50	34.3846	33.8379	33.2948	32.7586	32.2355	31.7223	31.2107	30.7038	30.2071	29.7204

Notes: <1> Data Based on Assumed DOS of Apr 1994.
              Authorized Period of Use of Table is Oct 1993 through Sep 1994.
         <2> Tabulated Data Based on Criteria Contained in 18 Mar 91 Tri-Service Memorandum
              of Agreement on Criteria/Standards for EA/LCC for MILCON Design.
              Data Based on Discount Rate of 3.1% and DOE Projections of Future Price Level Changes
              for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1993).

Table E-3-LP-5. Present Worth Factors--Liquefied Petroleum Gas (LPG)

Number of Payments	Beneficial Occupancy Date									
	Oct 1994	Oct 1995	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003
1	0.9571	0.9250	0.9055	0.8900	0.8781	0.8687	0.8594	0.8507	0.8411	0.8263
2	1.8820	1.8305	1.7955	1.7681	1.7468	1.7281	1.7102	1.6918	1.6674	1.6354
3	2.7875	2.7205	2.6736	2.6368	2.6062	2.5788	2.5512	2.5181	2.4765	2.4287
4	3.6775	3.5986	3.5423	3.4962	3.4569	3.4199	3.3775	3.3272	3.2697	3.2077
5	4.5556	4.4672	4.4017	4.3469	4.2980	4.2462	4.1866	4.1205	4.0487	3.9739
6	5.4243	5.3267	5.2524	5.1880	5.1243	5.0553	4.9799	4.8995	4.8149	4.7280
7	6.2837	6.1774	6.0935	6.0143	5.9334	5.8486	5.7589	5.6657	5.5691	5.4701
8	7.1345	7.0185	6.9198	6.8234	6.7267	6.6276	6.5251	6.4198	6.3112	6.1963
9	7.9755	7.8448	7.7289	7.6167	7.5057	7.3938	7.2792	7.1619	7.0373	6.9030
10	8.8018	8.6539	8.5222	8.3957	8.2719	8.1479	8.0213	7.8881	7.7440	7.5907
11	9.6109	9.4471	9.3012	9.1619	9.0260	8.8900	8.7475	8.5948	8.4317	8.2599
12	10.4042	10.2261	10.0674	9.9160	9.7681	9.6162	9.4542	9.2825	9.1010	8.9112
13	11.1832	10.9923	10.8215	10.6581	10.4943	10.3228	10.1419	9.9517	9.7523	9.5450
14	11.9494	11.7465	11.5636	11.3843	11.2009	11.0106	10.8112	10.6030	10.3860	10.1617
15	12.7035	12.4886	12.2898	12.0909	11.8887	11.6798	11.4624	11.2368	11.0028	10.7619
16	13.4456	13.2147	12.9965	12.7787	12.5579	12.3311	12.0962	11.8535	11.6029	11.3459
17	14.1718	13.9214	13.6842	13.4479	13.2092	12.9649	12.7130	12.4537	12.1870	11.9142
18	14.8785	14.6091	14.3534	14.0992	13.8430	13.5816	13.3131	13.0377	12.7553	12.4672
19	15.5662	15.2784	15.0047	14.7330	14.4597	14.1818	13.8971	13.6060	13.3083	13.0053
20	16.2355	15.9297	15.6385	15.3497	15.0599	14.7658	14.4654	14.1590	13.8464	13.5289
21	16.8867	16.5634	16.2552	15.9499	15.6439	15.3341	15.0184	14.6971	14.3700	14.0384
22	17.5205	17.1802	16.8554	16.5339	16.2152	15.8871	15.5565	15.2207	14.8795	14.5342
23	18.1373	17.7803	17.4394	17.1022	16.7652	16.4252	16.0801	15.7302	15.3752	15.0166
24	18.7374	18.3644	18.0077	17.6552	17.3033	16.9488	16.5896	16.2260	15.8576	15.4859
25	19.3214	18.9327	18.5607	18.1933	17.8269	17.4583	17.0854	16.7084	16.3270	15.9428
30	22.0139	21.5526	21.1101	20.6739	20.2408	19.8074	19.3715	18.9331	18.4920	18.0495
35	24.3631	23.8387	23.3348	22.8389	22.3475	21.8572	21.3659	20.8736	20.3801	19.8866
40	26.4128	25.8331	25.2753	24.7270	24.1846	23.6447	23.1051	22.5658	22.0266	21.4886
45	28.2003	27.5723	26.9675	26.3735	25.7866	25.2034	24.6217	24.0415	23.4624	22.8857
50	29.7591	29.0889	28.4432	27.8093	27.1836	26.5627	25.9443	25.3283	24.7145	24.1039

Notes: <1> Data Based on Assumed DOS of Apr 1994.
Authorized Period of Use of Table is Oct 1993 through Sep 1994.
<2> Tabulated Data Based on Criteria Contained in 18 Mar 91 Tri-Service Memorandum
of Agreement on Criteria/Standards for EA/LCC for MILCON Design.
Data Based on Discount Rate of 3.1% and DOE Projections of Future Price Level Changes
for Residential Sector (NIST Annual Supplement to Handbook 135, Oct 1993).

Part II. Tables of Present Worth Factors for Non-Energy Studies

Part II contains tables of present worth factors for use in computing the life-cycle costs of the competing alternatives in a non-energy study, where energy costs are either nonexistent or equal among all alternatives, in accordance with the provisions of governing DoD criteria (see Appendix A). The discount rates used to compute these present worth factors were taken from Appendix C of OMB Circular A-94 (March 1993). See the Preface of this report for the rationale for using a 4.0% discount rate for studies with short-term total study periods (10 years or less) and a 4.5% discount rate for studies with long-term total study periods (longer than 10 years).

Tables NE-1-1-ST, "Present Worth Factors--One-Time Costs, Zero Differential Escalation (Short Term Studies)" and NE-1-1-LT, "Present Worth Factors--One-Time Costs, Zero Differential Escalation (Long-Term Studies)" provide factors for costs which occur one time or at irregular time intervals throughout the study period and which increase at approximately the rate of general inflation (hence the term "zero differential escalation"). These costs may include construction/acquisition costs, non-annually recurring maintenance costs, major repair and replacement costs, and retention/salvage value or disposal cost. These factors are called "single present worth" (SPW) factors. The present worth of each cost occurrence is found by multiplying that cost, in Date-of-Study (DOS) prices, by the SPW factor corresponding to the time of occurrence (years after DOS). Interpolation is encouraged for non-integer time periods.

Table NE-1-1-ST should be used for short-term LCC studies, i.e., studies with a total study period of 10 years or less. This table is based on a 4.0% (real) discount rate. Table NE-1-1-LT should be used for long-term LCC studies, i.e., studies with a total study period longer than 10 years. This table is based on a 4.5% (real) discount rate. Note that the total length of the study period determines which table to use, not the time that a one-time cost is incurred. Thus, for a non-routine maintenance cost that occurs in the fifth year after the Beneficial Occupancy Date (BOD), in a LCC analysis with 30 years of beneficial occupancy (i.e., occupancy or usage), use the 5-year factor from table NE-1-1-LT (0.8025).

Tables NE-1-2-ST, "Present Worth Factors--One-Time Costs, Non-Zero Differential Escalation (Short-Term Studies)" and NE-1-2-LT, "Present Worth Factors--One-Time Costs, Non-Zero Differential Escalation (Long-Term Studies)" provide present worth factors for costs which occur one time or at irregular intervals throughout the study period and which change faster or more slowly than general price inflation. The "differential escalation rate" is the difference between the rate of increase in the particular type of cost under consideration and general price inflation[1]. Present worth factors are shown for differential escalation rates ranging from -5% to +5% in 1% increments. These factors are sometimes called "modified single present worth" (SPW*) factors. The present worth of each cost occurrence is found by multiplying that cost, in DOS prices, by the SPW* factor corresponding to the time of occurrence (years after DOS) and the differential

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[1] A more accurate way of calculating the differential escalation rate for a project-related cost is:

$$e = (1+E)/(1+I) - 1$$

where
- e = the differential escalation rate,
- E = the actual escalation rate, and
- I = the rate of general inflation.

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escalation rate. Interpolation is encouraged for time periods and escalation rates other than those shown on the table.

Table NE-1-2-ST should be used for short-term LCC studies, i.e., studies with a total study period of 10 years or less. This table is based on a 4.0% (real) discount rate. Table NE-1-2-LT should be used for long-term LCC studies, i.e., studies with a total study period longer than 10 years. This table is based on a 4.5% (real) discount rate. Note that the total length of the study period determines which table to use, not the time that a one-time cost is incurred. Thus, for a non-routine maintenance cost that is expected to occur in the fifth year after BOD and is expected to increase at an average annual rate of 2% above inflation, in a LCC analysis with a 30 year beneficial occupancy period, use the 5-year factor from table NE-1-2-LT (0.8860).

Table NE-2-1 provides present worth factors for costs which are incurred annually throughout the study period, such as routine maintenance and repair costs, and which are not expected to change faster or more slowly than the rate of general inflation. These factors are called "uniform present worth" (UPW) factors. The factors in this table are based on the assumption that the DOS is in April 1994, the BOD is in October of the same year or a future year, and that the annual cost occurs approximately at mid-year during each year of occupancy, or represents the sum of several costs distributed relatively uniformly throughout the year. The present worth of a cost recurring annually over the study period is found by multiplying the annual amount, in DOS prices, by the appropriate UPW factor. The number of payments generally corresponds to the number of years in the study period after BOD. Interpolation is encouraged for study periods and for BODs other than those shown on the tables.

Tables NE-2-2 through NE-2-11 provide present worth factors for costs which are incurred annually throughout the study period and which are expected to change faster or more slowly than the rate of general inflation. The differential rate of escalation is included in the table title; these differential rates range from -5% to +5% in 1% increments. Present worth factors which include escalation are sometimes called "modified uniform present worth" (UPW*) factors. The UPW* factors in this table are based on the assumption that the DOS is in April 1994, the BOD is in October of the same year or a future year, and that the annual cost occurs approximately at mid-year during each year of occupancy, or represents the sum of several costs distributed relatively uniformly throughout the year. The present worth of a cost recurring annually over the study period is found by multiplying the annual amount, in DOS prices, by the appropriate UPW* factor. The number of payments generally corresponds to the number of years in the study period after BOD. Interpolation is encouraged for study periods and escalation rates and BODs other than those shown on the tables.

As noted in the Preface, the tables for annually recurring costs (NE-2-1 through NE-2-11) are based on the assumption that the Date of Study is April, 1994, and that the BOD occurs in October of 1994 (or October of a subsequent year, through 2003). Therefore, for an LCC analysis covering a 10-year beneficial occupancy period beginning in October 1994, the total study period would be 10.5 years (April 1994 through October 2004). Accordingly, the present worth factor for beneficial occupancy periods of 10 years or longer are computed using the 4.5% discount rate for a long-term project.

Table NE-1-1-ST.   Present Worth Factors--One-Time Costs,
Zero Differential Escalation (Short-Term Studies)

Time Cost Incurred (Years after DOS)	SPW Factor
0.00	1.0000
0.25	0.9902
0.50	0.9806
0.75	0.9710
1	0.9615
2	0.9246
3	0.8890
4	0.8548
5	0.8219
6	0.7903
7	0.7599
8	0.7307
9	0.7026
10	0.6756

Notes: <1> Authorized Period of Use of Table is Oct 1993 through Sep 1994.
<2> Tabulated Data Based on Criteria Contained in 18 Mar 91 Tri-Service Memorandum
of Agreement on Criteria/Standards for EA/LCC for MILCON Design. (Discount Rate = 4.0%)
<3> Covers Costs such as Construction, Procurement, Replacement, Disposal.

Table NE-1-1-LT.   Present Worth Factors--One-Time Costs,
Zero Differential Escalation (Long-Term Studies)

Time Cost Incurred (Years after DOS)	SPW Factor	Time Cost Incurred (Years after DOS)	SPW Factor
0.00	1.0000	16	0.4945
0.25	0.9891	17	0.4732
0.50	0.9782	18	0.4528
0.75	0.9675	19	0.4333
		20	0.4146
1	0.9569	21	0.3968
2	0.9157	22	0.3797
3	0.8763	23	0.3634
4	0.8386	24	0.3477
5	0.8025	25	0.3327
6	0.7679	26	0.3184
7	0.7348	27	0.3047
8	0.7032	28	0.2916
9	0.6729	29	0.2790
10	0.6439	30	0.2670
11	0.6162	35	0.2143
12	0.5897	40	0.1719
13	0.5643	45	0.1380
14	0.5400	50	0.1107
15	0.5167		

Notes: <1> Authorized Period of Use of Table is Oct 1993 through Sep 1994.
<2> Tabulated Data Based on Criteria Contained in 18 Mar 91 Tri-Service Memorandum
of Agreement on Criteria/Standards for EA/LCC for MILCON Design. (Discount Rate = 4.5%)
<3> Covers Costs such as Construction, Procurement, Replacement, Disposal.

Table NE-1-2-ST.   Present Worth Factors--One-Time Costs, Non-Zero Differential Escalation (Short-Term Studies)

Time Cost Incurred (Years after DOS)	Differential Escalation Rate									
	-5%	-4%	-3%	-2%	-1%	1%	2%	3%	4%	5%
0.00	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
0.25	0.9776	0.9802	0.9827	0.9853	0.9878	0.9927	0.9952	0.9976	1.0000	1.0024
0.50	0.9558	0.9608	0.9658	0.9707	0.9757	0.9855	0.9903	0.9952	1.0000	1.0048
0.75	0.9344	0.9417	0.9491	0.9564	0.9637	0.9783	0.9855	0.9928	1.0000	1.0072
1	0.9135	0.9231	0.9327	0.9423	0.9519	0.9712	0.9808	0.9904	1.0000	1.0096
2	0.8344	0.8521	0.8699	0.8879	0.9062	0.9431	0.9619	0.9809	1.0000	1.0193
3	0.7622	0.7865	0.8114	0.8367	0.8626	0.9159	0.9434	0.9714	1.0000	1.0291
4	0.6962	0.7260	0.7568	0.7884	0.8211	0.8895	0.9253	0.9621	1.0000	1.0390
5	0.6360	0.6702	0.7058	0.7430	0.7816	0.8639	0.9075	0.9528	1.0000	1.0490
6	0.5810	0.6186	0.6583	0.7001	0.7441	0.8389	0.8900	0.9437	1.0000	1.0591
7	0.5307	0.5710	0.6140	0.6597	0.7083	0.8147	0.8729	0.9346	1.0000	1.0693
8	0.4848	0.5271	0.5727	0.6216	0.6742	0.7912	0.8561	0.9256	1.0000	1.0796
9	0.4428	0.4866	0.5341	0.5858	0.6418	0.7684	0.8397	0.9167	1.0000	1.0899
10	0.4045	0.4491	0.4982	0.5520	0.6110	0.7462	0.8235	0.9079	1.0000	1.1004

Notes: <1> Authorized Period of Use of Table is Oct 1993 through Sep 1994.
<2> Tabulated Data Based on Criteria Contained in 18 Mar 91 Tri-Service Memorandum
    of Agreement on Criteria/Standards for EA/LCC for MILCON Design (Discount Rate = 4.0%).
<3> Covers Costs such as Construction, Procurement, Replacement, Disposal

Table NE-1-2-LT. Present Worth Factors--One-Time Costs, Non-Zero Differential Escalation (Long-Term Studies)

Time Cost Incurred (Years after DOS)	Differential Escalation Rate									
	-5%	-4%	-3%	-2%	-1%	1%	2%	3%	4%	5%
0.00	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
0.25	0.9765	0.9790	0.9816	0.9841	0.9866	0.9915	0.9940	0.9964	0.9988	1.0012
0.50	0.9535	0.9585	0.9634	0.9684	0.9733	0.9831	0.9880	0.9928	0.9976	1.0024
0.75	0.9310	0.9384	0.9457	0.9530	0.9603	0.9748	0.9820	0.9892	0.9964	1.0036
1	0.9091	0.9187	0.9282	0.9378	0.9474	0.9665	0.9761	0.9856	0.9952	1.0048
2	0.8264	0.8439	0.8616	0.8795	0.8975	0.9341	0.9527	0.9715	0.9905	1.0096
3	0.7513	0.7753	0.7998	0.8248	0.8503	0.9028	0.9299	0.9576	0.9857	1.0144
4	0.6830	0.7122	0.7424	0.7735	0.8055	0.8726	0.9077	0.9438	0.9810	1.0193
5	0.6209	0.6543	0.6891	0.7254	0.7631	0.8434	0.8860	0.9303	0.9763	1.0242
6	0.5645	0.6011	0.6396	0.6802	0.7230	0.8151	0.8648	0.9169	0.9716	1.0291
7	0.5132	0.5522	0.5937	0.6379	0.6849	0.7878	0.8441	0.9037	0.9670	1.0340
8	0.4665	0.5073	0.5511	0.5982	0.6489	0.7614	0.8239	0.8908	0.9624	1.0389
9	0.4241	0.4660	0.5116	0.5610	0.6147	0.7359	0.8042	0.8780	0.9578	1.0439
10	0.3855	0.4281	0.4748	0.5261	0.5824	0.7113	0.7849	0.8654	0.9532	1.0489
11	0.3505	0.3933	0.4408	0.4934	0.5517	0.6875	0.7662	0.8530	0.9486	1.0539
12	0.3186	0.3613	0.4091	0.4627	0.5227	0.6644	0.7478	0.8407	0.9441	1.0590
13	0.2897	0.3319	0.3798	0.4339	0.4952	0.6422	0.7299	0.8287	0.9396	1.0640
14	0.2633	0.3049	0.3525	0.4069	0.4691	0.6207	0.7125	0.8168	0.9351	1.0691
15	0.2394	0.2801	0.3272	0.3816	0.4444	0.5999	0.6954	0.8050	0.9306	1.0742
16	0.2176	0.2573	0.3037	0.3579	0.4210	0.5798	0.6788	0.7935	0.9261	1.0794
17	0.1978	0.2364	0.2819	0.3356	0.3989	0.5604	0.6626	0.7821	0.9217	1.0845
18	0.1799	0.2172	0.2617	0.3148	0.3779	0.5416	0.6467	0.7709	0.9173	1.0897
19	0.1635	0.1995	0.2429	0.2952	0.3580	0.5235	0.6312	0.7598	0.9129	1.0949
20	0.1486	0.1833	0.2255	0.2768	0.3391	0.5059	0.6161	0.7489	0.9085	1.1002
21	0.1351	0.1684	0.2093	0.2596	0.3213	0.4890	0.6014	0.7381	0.9042	1.1054
22	0.1228	0.1547	0.1943	0.2435	0.3044	0.4726	0.5870	0.7275	0.8999	1.1107
23	0.1117	0.1421	0.1803	0.2283	0.2884	0.4568	0.5730	0.7171	0.8956	1.1160
24	0.1015	0.1305	0.1674	0.2141	0.2732	0.4415	0.5593	0.7068	0.8913	1.1214
25	0.0923	0.1199	0.1554	0.2008	0.2588	0.4267	0.5459	0.6967	0.8870	1.1267
26	0.0839	0.1102	0.1442	0.1883	0.2452	0.4124	0.5328	0.6867	0.8828	1.1321
27	0.0763	0.1012	0.1339	0.1766	0.2323	0.3986	0.5201	0.6768	0.8785	1.1376
28	0.0693	0.0930	0.1243	0.1656	0.2201	0.3852	0.5076	0.6671	0.8743	1.1430
29	0.0630	0.0854	0.1153	0.1553	0.2085	0.3723	0.4955	0.6575	0.8702	1.1485
30	0.0573	0.0785	0.1071	0.1456	0.1975	0.3599	0.4836	0.6481	0.8660	1.1540
35	0.0356	0.0513	0.0738	0.1056	0.1507	0.3035	0.4285	0.6029	0.8455	1.1818
40	0.0221	0.0336	0.0508	0.0766	0.1150	0.2560	0.3796	0.5608	0.8254	1.2104
45	0.0137	0.0220	0.0350	0.0556	0.0878	0.2159	0.3363	0.5217	0.8059	1.2396
50	0.0085	0.0144	0.0241	0.0403	0.0670	0.1821	0.2980	0.4853	0.7868	1.2696

Notes: <1> Authorized Period of Use of Table is Oct 1993 through Sep 1994.
        <2> Tabulated Data Based on Criteria Contained in 18 Mar 91 Tri-Service Memorandum
            of Agreement on Criteria/Standards for EA/LCC for MILCON Design (Discount Rate = 4.5%).
        <3> Covers Costs such as Construction, Procurement, Replacement, Disposal

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Table NE-2-1. Present Worth Factors--Annually Recurring Costs,
Zero Differential Escalation (e = 0%)

Number of Payments	Beneficial Occupancy Date									
	Oct 1994	Oct 1995	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003
1	0.9615	0.9246	0.8890	0.8548	0.8219	0.7903	0.7599	0.7307	0.7026	0.6439
2	1.8861	1.8136	1.7438	1.6767	1.6122	1.5502	1.4906	1.4333	1.3168	1.2601
3	2.7751	2.6684	2.5657	2.4670	2.3722	2.2809	2.1932	2.0200	1.9330	1.8498
4	3.6299	3.4903	3.3560	3.2270	3.1028	2.9835	2.7548	2.6362	2.5227	2.4141
5	4.4518	4.2806	4.1160	3.9577	3.8054	3.5227	3.3710	3.2259	3.0870	2.9540
6	5.2421	5.0405	4.8467	4.6602	4.3252	4.1389	3.9607	3.7902	3.6269	3.4708
7	6.0021	5.7712	5.5492	5.1638	4.9414	4.7286	4.5250	4.3301	4.1437	3.9652
8	6.7327	6.4738	6.0401	5.7800	5.5311	5.2929	5.0650	4.8468	4.6381	4.4384
9	7.4353	6.9558	6.6562	6.3696	6.0953	5.8328	5.5817	5.3413	5.1113	4.8912
10	7.9127	7.5720	7.2459	6.9339	6.6353	6.3496	6.0761	5.8145	5.5641	5.3245
11	8.5289	8.1616	7.8102	7.4739	7.1520	6.8440	6.5493	6.2673	5.9974	5.7391
12	9.1186	8.7259	8.3502	7.9906	7.6465	7.3172	7.0021	6.7006	6.4121	6.1359
13	9.6829	9.2659	8.8669	8.4851	8.1197	7.7700	7.4354	7.1152	6.8088	6.5156
14	10.2228	9.7826	9.3613	8.9582	8.5725	8.2033	7.8501	7.5120	7.1885	6.8790
15	10.7395	10.2771	9.8345	9.4110	9.0058	8.6180	8.2469	7.8917	7.5519	7.2267
16	11.2340	10.7503	10.2873	9.8443	9.4204	9.0147	8.6266	8.2551	7.8996	7.5594
17	11.7072	11.2031	10.7206	10.2590	9.8172	9.3944	8.9899	8.6028	8.2323	7.8778
18	12.1600	11.6364	11.1353	10.6558	10.1969	9.7578	9.3376	8.9355	8.5507	8.1825
19	12.5933	12.0510	11.5321	11.0355	10.5602	10.1055	9.6703	9.2539	8.8554	8.4741
20	13.0079	12.4478	11.9118	11.3988	10.9080	10.4382	9.9887	9.5586	9.1470	8.7531
21	13.4047	12.8275	12.2751	11.7465	11.2407	10.7566	10.2934	9.8502	9.4260	9.0201
22	13.7844	13.1908	12.6228	12.0792	11.5591	11.0613	10.5850	10.1292	9.6930	9.2756
23	14.1478	13.5385	12.9555	12.3976	11.8638	11.3529	10.8640	10.3962	9.9485	9.5201
24	14.4955	13.8713	13.2739	12.7023	12.1553	11.6319	11.1310	10.6517	10.1930	9.7541
25	14.8282	14.1897	13.5786	12.9939	12.4344	11.8989	11.3865	10.8962	10.4270	9.9780
30	16.2889	15.5875	14.9162	14.2739	13.6592	13.0710	12.5082	11.9695	11.4541	10.9609
35	17.4610	16.7091	15.9896	15.3010	14.6421	14.0116	13.4082	12.8308	12.2783	11.7496
40	18.4016	17.6092	16.8509	16.1252	15.4309	14.7664	14.1305	13.5220	12.9397	12.3825
45	19.1563	18.3314	17.5420	16.7866	16.0638	15.3720	14.7101	14.0766	13.4705	12.8904
50	19.7620	18.9110	18.0967	17.3174	16.5717	15.8580	15.1752	14.5217	13.8963	13.2979

Notes: <1> Data Based on Assumed DOS of Apr 1994.
Authorized Period of Use of Table is Oct 1993 through Sep 1994.
<2> Tabulated Data Based on Criteria Contained in 18 Mar 91 Tri-Service Memorandum
of Agreement on Criteria/Standards for EA/LCC for MILCON Design
(Discount rate = 4.0% for total study periods of 10 years or less;
discount rate = 4.5% for total study periods greater than 10 years.)
<3> Covers Costs such as Routine Maintenance & Repair and Custodial.

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Table NE-2-2.   Present Worth Factors--Annually Recurring Costs,
Non-Zero Differential Escalation (e = -5%)

Number of Payments	Beneficial Occupancy Date									
	Oct 1994	Oct 1995	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003
1	0.9135	0.8344	0.7622	0.6962	0.6360	0.5810	0.5307	0.4848	0.4428	0.3855
2	1.7479	1.5966	1.4584	1.3322	1.2169	1.1116	1.0154	0.9276	0.8096	0.7360
3	2.5101	2.2929	2.0944	1.9132	1.7476	1.5964	1.4582	1.2761	1.1601	1.0547
4	3.2063	2.9288	2.6754	2.4439	2.2324	2.0392	1.7893	1.6266	1.4788	1.3443
5	3.8423	3.5098	3.2061	2.9286	2.6752	2.3538	2.1398	1.9453	1.7684	1.6077
6	4.4233	4.0405	3.6908	3.3714	2.9747	2.7043	2.4584	2.2349	2.0318	1.8471
7	4.9539	4.5252	4.1336	3.6577	3.3252	3.0229	2.7481	2.4983	2.2712	2.0647
8	5.4387	4.9680	4.4090	4.0082	3.6438	3.3126	3.0114	2.7377	2.4888	2.2625
9	5.8815	5.2355	4.7595	4.3268	3.9335	3.5759	3.2508	2.9553	2.6866	2.4424
10	6.1446	5.5860	5.0782	4.6165	4.1968	3.8153	3.4684	3.1531	2.8665	2.6059
11	6.4951	5.9046	5.3678	4.8798	4.4362	4.0329	3.6663	3.3330	3.0300	2.7545
12	6.8137	6.1943	5.6312	5.1192	4.6538	4.2308	3.8462	3.4965	3.1786	2.8897
13	7.1034	6.4576	5.8705	5.3369	4.8517	4.4106	4.0097	3.6451	3.3138	3.0125
14	7.3667	6.6970	6.0882	5.5347	5.0315	4.5741	4.1583	3.7803	3.4366	3.1242
15	7.6061	6.9146	6.2860	5.7146	5.1951	4.7228	4.2934	3.9031	3.5483	3.2257
16	7.8237	7.1125	6.4659	5.8781	5.3437	4.8579	4.4163	4.0148	3.6498	3.3180
17	8.0216	7.2923	6.6294	6.0267	5.4788	4.9808	4.5280	4.1163	3.7421	3.4019
18	8.2014	7.4558	6.7780	6.1618	5.6017	5.0924	4.6295	4.2086	3.8260	3.4782
19	8.3649	7.6045	6.9132	6.2847	5.7134	5.1940	4.7218	4.2925	3.9023	3.5475
20	8.5136	7.7396	7.0360	6.3964	5.8149	5.2863	4.8057	4.3688	3.9716	3.6106
21	8.6487	7.8624	7.1477	6.4979	5.9072	5.3702	4.8820	4.4381	4.0347	3.6679
22	8.7715	7.9741	7.2492	6.5902	5.9911	5.4464	4.9513	4.5012	4.0920	3.7200
23	8.8832	8.0757	7.3415	6.6741	6.0674	5.5158	5.0143	4.5585	4.1441	3.7674
24	8.9847	8.1679	7.4254	6.7504	6.1367	5.5788	5.0717	4.6106	4.1914	3.8104
25	9.0770	8.2519	7.5017	6.8197	6.1997	5.6361	5.1238	4.6580	4.2345	3.8496
30	9.4269	8.5699	7.7908	7.0826	6.4387	5.8534	5.3212	4.8375	4.3977	3.9979
35	9.6442	8.7674	7.9704	7.2458	6.5871	5.9883	5.4439	4.9490	4.4991	4.0901
40	9.7791	8.8900	8.0819	7.3471	6.6792	6.0720	5.5200	5.0182	4.5620	4.1473
45	9.8628	8.9662	8.1511	7.4101	6.7364	6.1240	5.5673	5.0612	4.6011	4.1828
50	9.9148	9.0135	8.1941	7.4491	6.7720	6.1563	5.5967	5.0879	4.6253	4.2048

Notes: <1> Data Based on Assumed DOS of Apr 1994.
         <2> Authorized Period of Use of Table is Oct 1993 through Sep 1994.
              Tabulated Data Based on Criteria Contained in 18 Mar 91 Tri-Service Memorandum
              of Agreement on Criteria/Standards for EA/LCC for MILCON Design
              (Discount rate = 4.0% for total study periods of 10 years or less;
              discount rate = 4.5% for total study periods greater than 10 years.)
         <3> Covers Costs such as Routine Maintenance & Repair and Custodial.

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Table NE-2-3.   Present Worth Factors--Annually Recurring Costs,
Non-Zero Differential Escalation (e = -4%)

Number of Payments	Beneficial Occupancy Date									
	Oct 1994	Oct 1995	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003
1	0.9231	0.8521	0.7865	0.7260	0.6702	0.6186	0.5710	0.5271	0.4866	0.4281
2	1.7751	1.6386	1.5126	1.3962	1.2888	1.1897	1.0982	1.0137	0.8941	0.8214
3	2.5617	2.3646	2.1827	2.0148	1.8598	1.7168	1.5847	1.4014	1.2874	1.1827
4	3.2877	3.0348	2.8014	2.5859	2.3870	2.2033	1.9536	1.7947	1.6487	1.5146
5	3.9579	3.6534	3.3724	3.1130	2.8735	2.5546	2.3469	2.1560	1.9806	1.8195
6	4.5765	4.2245	3.8995	3.5995	3.2089	2.9479	2.7081	2.4879	2.2855	2.0996
7	5.1475	4.7516	4.3861	3.9212	3.6022	3.3092	3.0400	2.7928	2.5656	2.3569
8	5.6747	5.2381	4.6965	4.3145	3.9635	3.6411	3.3450	3.0729	2.8229	2.5933
9	6.1612	5.5404	5.0897	4.6757	4.2954	3.9460	3.6251	3.3302	3.0593	2.8105
10	6.4591	5.9337	5.4510	5.0077	4.6003	4.2261	3.8824	3.5666	3.2765	3.0100
11	6.8523	6.2950	5.7829	5.3126	4.8804	4.4835	4.1188	3.7838	3.4760	3.1933
12	7.2136	6.6269	6.0879	5.5927	5.1378	4.7199	4.3359	3.9833	3.6593	3.3616
13	7.5455	6.9318	6.3680	5.8500	5.3742	4.9370	4.5354	4.1665	3.8276	3.5163
14	7.8504	7.2119	6.6253	6.0864	5.5913	5.1365	4.7187	4.3349	3.9823	3.6584
15	8.1306	7.4692	6.8617	6.3035	5.7908	5.3198	4.8871	4.4896	4.1244	3.7889
16	8.3879	7.7056	7.0788	6.5030	5.9741	5.4882	5.0418	4.6317	4.2549	3.9088
17	8.6243	7.9228	7.2783	6.6863	6.1425	5.6428	5.1838	4.7622	4.3748	4.0190
18	8.8414	8.1223	7.4616	6.8547	6.2971	5.7849	5.3144	4.8821	4.4850	4.1202
19	9.0409	8.3055	7.6300	7.0094	6.4392	5.9155	5.4343	4.9923	4.5862	4.2132
20	9.2242	8.4739	7.7846	7.1514	6.5698	6.0354	5.5445	5.0935	4.6792	4.2986
21	9.3926	8.6286	7.9267	7.2820	6.6897	6.1455	5.6457	5.1864	4.7646	4.3770
22	9.5472	8.7707	8.0573	7.4019	6.7998	6.2467	5.7386	5.2718	4.8430	4.4491
23	9.6893	8.9012	8.1772	7.5121	6.9010	6.3397	5.8240	5.3503	4.9151	4.5153
24	9.8199	9.0211	8.2873	7.6133	6.9940	6.4251	5.9025	5.4224	4.9813	4.5761
25	9.9398	9.1313	8.3885	7.7062	7.0794	6.5036	5.9746	5.4886	5.0422	4.6320
30	10.4080	9.5614	8.7837	8.0692	7.4129	6.8099	6.2560	5.7471	5.2797	4.8502
35	10.7143	9.8428	9.0422	8.3067	7.6311	7.0103	6.4401	5.9163	5.4351	4.9930
40	10.9148	10.0270	9.2114	8.4621	7.7738	7.1415	6.5606	6.0270	5.5367	5.0864
45	11.0459	10.1474	9.3220	8.5638	7.8672	7.2273	6.6394	6.0994	5.6033	5.1475
50	11.1317	10.2263	9.3945	8.6303	7.9283	7.2834	6.6910	6.1468	5.6468	5.1875

Notes: <1> Data Based on Assumed DOS of Apr 1994.
Authorized Period of Use of Table is Oct 1993 through Sep 1994.
<2> Tabulated Data Based on Criteria Contained in 18 Mar 91 Tri-Service Memorandum
of Agreement on Criteria/Standards for EA/LCC for MILCON Design
(Discount rate = 4.0% for total study periods of 10 years or less;
discount rate = 4.5% for total study periods greater than 10 years.)
<3> Covers Costs such as Routine Maintenance & Repair and Custodial.

Table NE-2-4. Present Worth Factors--Annually Recurring Costs, Non-Zero Differential Escalation (e = -3%)

Number of Payments	Beneficial Occupancy Date									
	Oct 1994	Oct 1995	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003
1	0.9327	0.8699	0.8114	0.7568	0.7058	0.6583	0.6140	0.5727	0.5341	0.4748
2	1.8026	1.6813	1.5681	1.4626	1.3641	1.2723	1.1867	1.1068	0.9864	0.9156
3	2.6140	2.4380	2.2739	2.1209	1.9781	1.8450	1.7208	1.5375	1.4272	1.3247
4	3.3707	3.1438	2.9322	2.7349	2.5508	2.3791	2.1313	1.9783	1.8363	1.7045
5	4.0765	3.8022	3.5462	3.3076	3.0849	2.7709	2.5720	2.3874	2.2161	2.0570
6	4.7348	4.4162	4.1189	3.8417	3.4600	3.2117	2.9812	2.7672	2.5686	2.3842
7	5.3488	4.9888	4.6530	4.2024	3.9008	3.6208	3.3609	3.1197	2.8958	2.6880
8	5.9215	5.5230	5.0021	4.6431	4.3099	4.0006	3.7134	3.4469	3.1995	2.9699
9	6.4557	5.8637	5.4429	5.0523	4.6897	4.3531	4.0407	3.7507	3.4815	3.2316
10	6.7920	6.3045	5.8520	5.4320	5.0422	4.6803	4.3444	4.0326	3.7432	3.4745
11	7.2327	6.7136	6.2318	5.7845	5.3694	4.9840	4.6263	4.2943	3.9861	3.7000
12	7.6419	7.0934	6.5843	6.1118	5.6731	5.2660	4.8880	4.5372	4.2116	3.9093
13	8.0216	7.4459	6.9115	6.4155	5.9550	5.5276	5.1309	4.7627	4.4209	4.1036
14	8.3742	7.7731	7.2153	6.6974	6.2167	5.7706	5.3564	4.9720	4.6151	4.2839
15	8.7014	8.0769	7.4972	6.9591	6.4597	5.9960	5.5657	5.1663	4.7955	4.4513
16	9.0051	8.3588	7.7589	7.2020	6.6851	6.2053	5.7600	5.3466	4.9629	4.6067
17	9.2870	8.6205	8.0018	7.4275	6.8944	6.3996	5.9403	5.5140	5.1182	4.7509
18	9.5487	8.8634	8.2273	7.6368	7.0887	6.5799	6.1077	5.6694	5.2625	4.8848
19	9.7916	9.0889	8.4366	7.8311	7.2690	6.7473	6.2631	5.8136	5.3963	5.0090
20	10.0171	9.2982	8.6309	8.0114	7.4364	6.9027	6.4073	5.9475	5.5206	5.1244
21	10.2264	9.4925	8.8112	8.1788	7.5918	7.0469	6.5412	6.0717	5.6359	5.2315
22	10.4207	9.6728	8.9786	8.3342	7.7360	7.1808	6.6654	6.1871	5.7430	5.3308
23	10.6010	9.8402	9.1340	8.4784	7.8699	7.3051	6.7808	6.2941	5.8424	5.4231
24	10.7684	9.9956	9.2782	8.6123	7.9942	7.4204	6.8879	6.3935	5.9347	5.5087
25	10.9238	10.1398	9.4121	8.7365	8.1095	7.5275	6.9872	6.4858	6.0203	5.5882
30	11.5486	10.7197	9.9504	9.2362	8.5733	7.9580	7.3869	6.8567	6.3646	5.9078
35	11.9791	11.1194	10.3213	9.5806	8.8930	8.2547	7.6623	7.1123	6.6019	6.1281
40	12.2758	11.3947	10.5769	9.8178	9.1132	8.4591	7.8520	7.2885	6.7654	6.2798
45	12.4802	11.5845	10.7531	9.9813	9.2650	8.6000	7.9828	7.4099	6.8781	6.3844
50	12.6211	11.7153	10.8745	10.0940	9.3696	8.6971	8.0729	7.4935	6.9557	6.4565

Notes: <1> Data Based on Assumed DOS of Apr 1994.
Authorized Period of Use of Table is Oct 1993 through Sep 1994.
<2> Tabulated Data Based on Criteria Contained in 18 Mar 91 Tri-Service Memorandum of Agreement on Criteria/Standards for EA/LCC for MILCON Design (Discount rate = 4.0% for total study periods of 10 years or less; discount rate = 4.5% for total study periods greater than 10 years.)
<3> Covers Costs such as Routine Maintenance & Repair and Custodial.

Table NE-2-5.   Present Worth Factors--Annually Recurring Costs, Non-Zero Differential Escalation (e = -2%)

Number of Payments	Beneficial Occupancy Date									
	Oct 1994	Oct 1995	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003
1	0.9423	0.8879	0.8367	0.7884	0.7430	0.7001	0.6597	0.6216	0.5858	0.5261
2	1.8303	1.7247	1.6252	1.5314	1.4431	1.3598	1.2813	1.2074	1.0872	1.0195
3	2.6670	2.5131	2.3681	2.2315	2.1028	1.9814	1.8671	1.6854	1.5806	1.4823
4	3.4554	3.2561	3.0682	2.8912	2.7244	2.5672	2.3233	2.1788	2.0433	1.9162
5	4.1984	3.9562	3.7279	3.5128	3.3102	3.0036	2.8167	2.6415	2.4772	2.3231
6	4.8985	4.6159	4.3496	4.0986	3.7289	3.4970	3.2795	3.0755	2.8842	2.7048
7	5.5582	5.2375	4.9353	4.5024	4.2223	3.9597	3.7134	3.4824	3.2658	3.0627
8	6.1798	5.8233	5.3271	4.9958	4.6851	4.3936	4.1203	3.8641	3.6237	3.3983
9	6.7656	6.2066	5.8206	5.4585	5.1190	4.8006	4.5020	4.2220	3.9593	3.7131
10	7.1444	6.7000	6.2833	5.8925	5.5259	5.1822	4.8599	4.5576	4.2741	4.0082
11	7.6378	7.1627	6.7172	6.2994	5.9076	5.5401	5.1955	4.8723	4.5693	4.2851
12	8.1005	7.5967	7.1242	6.6810	6.2655	5.8757	5.5103	5.1675	4.8461	4.5447
13	8.5345	8.0036	7.5058	7.0389	6.6011	6.1905	5.8054	5.4443	5.1057	4.7881
14	8.9414	8.3853	7.8637	7.3746	6.9159	6.4857	6.0823	5.7039	5.3492	5.0164
15	9.3231	8.7432	8.1993	7.6893	7.2110	6.7625	6.3419	5.9474	5.5775	5.2305
16	9.6810	9.0788	8.5141	7.9845	7.4879	7.0221	6.5853	6.1757	5.7916	5.4313
17	10.0166	9.3935	8.8093	8.2613	7.7475	7.2656	6.8136	6.3898	5.9924	5.6196
18	10.3313	9.6887	9.0861	8.5209	7.9909	7.4939	7.0277	6.5906	6.1807	5.7962
19	10.6265	9.9655	9.3457	8.7644	8.2192	7.7080	7.2285	6.7789	6.3573	5.9618
20	10.9033	10.2251	9.5891	8.9927	8.4333	7.9088	7.4168	6.9555	6.5229	6.1171
21	11.1629	10.4686	9.8174	9.2068	8.6341	8.0971	7.5934	7.1211	6.6782	6.2628
22	11.4064	10.6969	10.0316	9.4076	8.8224	8.2737	7.7590	7.2764	6.8238	6.3994
23	11.6347	10.9110	10.2323	9.5959	8.9990	8.4393	7.9143	7.4221	6.9604	6.5275
24	11.8488	11.1118	10.4206	9.7725	9.1646	8.5946	8.0600	7.5586	7.0885	6.6476
25	12.0496	11.3001	10.5972	9.9381	9.3199	8.7402	8.1966	7.6867	7.2086	6.7602
30	12.8811	12.0798	11.3285	10.6238	9.9630	9.3433	8.7621	8.2171	7.7060	7.2267
35	13.4841	12.6454	11.8589	11.1212	10.4295	9.7808	9.1724	8.6019	8.0668	7.5650
40	13.9216	13.0557	12.2436	11.4820	10.7678	10.0981	9.4700	8.8809	8.3285	7.8105
45	14.2389	13.3532	12.5226	11.7437	11.0133	10.3282	9.6858	9.0833	8.5183	7.9885
50	14.4691	13.5691	12.7251	11.9336	11.1913	10.4952	9.8424	9.2302	8.6560	8.1176

Notes: <1> Data Based on Assumed DOS of Apr 1994.
            Authorized Period of Use of Table is Oct 1993 through Sep 1994.
         <2> Tabulated Data Based on Criteria Contained in 18 Mar 91 Tri-Service Memorandum
            of Agreement on Criteria/Standards for EA/LCC for MILCON Design
            (Discount rate = 4.0% for total study periods of 10 years or less;
            discount rate = 4.5% for total study periods greater than 10 years.)
         <3> Covers Costs such as Routine Maintenance & Repair and Custodial.

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Table NE-2-6.   Present Worth Factors--Annually Recurring Costs,
Non-Zero Differential Escalation (e = -1%)

Number of Payments	\<\--- Beneficial Occupancy Date ---\> Oct 1994	Oct 1995	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003
1	0.9519	0.9062	0.8626	0.8211	0.7816	0.7441	0.7083	0.6742	0.6418	0.5824
2	1.8581	1.7687	1.6837	1.6028	1.5257	1.4524	1.3825	1.3161	1.1971	1.1341
3	2.7207	2.5899	2.4654	2.3468	2.2340	2.1266	2.0244	1.8459	1.7488	1.6567
4	3.5418	3.3715	3.2094	3.0551	2.9082	2.7684	2.5308	2.3976	2.2714	2.1519
5	4.3234	4.1156	3.9177	3.7294	3.5501	3.2538	3.0825	2.9203	2.7666	2.6210
6	5.0675	4.8239	4.5920	4.3712	4.0169	3.8055	3.6052	3.4155	3.2357	3.0654
7	5.7758	5.4981	5.2338	4.8224	4.5686	4.3282	4.1004	3.8846	3.6801	3.4864
8	6.4500	6.1399	5.6727	5.3741	5.0913	4.8233	4.5695	4.3290	4.1011	3.8853
9	7.0919	6.5702	6.2244	5.8968	5.5865	5.2924	5.0139	4.7500	4.5000	4.2631
10	7.5176	7.1219	6.7471	6.3920	6.0556	5.7368	5.4349	5.1489	4.8779	4.6211
11	8.0693	7.6446	7.2422	6.8611	6.5000	6.1579	5.8338	5.5267	5.2358	4.9603
12	8.5920	8.1397	7.7113	7.3055	6.9210	6.5567	6.2116	5.8847	5.5750	5.2816
13	9.0871	8.6088	8.1557	7.7265	7.3198	6.9346	6.5696	6.2238	5.8963	5.5859
14	9.5562	9.0533	8.5768	8.1254	7.6977	7.2926	6.9087	6.5451	6.2006	5.8743
15	10.0006	9.4743	8.9756	8.5032	8.0557	7.6317	7.2300	6.8495	6.4890	6.1475
16	10.4216	9.8731	9.3535	8.8612	8.3948	7.9530	7.5344	7.1379	6.7622	6.4063
17	10.8205	10.2510	9.7115	9.2003	8.7161	8.2574	7.8228	7.4111	7.0210	6.6515
18	11.1984	10.6090	10.0506	9.5216	9.0205	8.5457	8.0960	7.6699	7.2662	6.8837
19	11.5564	10.9481	10.3719	9.8260	9.3089	8.8189	8.3548	7.9150	7.4985	7.1038
20	11.8955	11.2694	10.6763	10.1144	9.5820	9.0777	8.5999	8.1473	7.7185	7.3123
21	12.2168	11.5738	10.9646	10.3876	9.8408	9.3229	8.8322	8.3674	7.9270	7.5098
22	12.5212	11.8622	11.2378	10.6464	10.0860	9.5552	9.0523	8.5758	8.1245	7.6969
23	12.8095	12.1353	11.4966	10.8915	10.3183	9.7752	9.2608	8.7733	8.3116	7.8741
24	13.0827	12.3941	11.7418	11.1238	10.5384	9.9837	9.4583	8.9605	8.4888	8.0421
25	13.3415	12.6393	11.9741	11.3439	10.7468	10.1812	9.6454	9.1377	8.6568	8.2012
30	14.4450	13.6847	12.9645	12.2821	11.6357	11.0233	10.4431	9.8935	9.3728	8.8795
35	15.2871	14.4825	13.7203	12.9982	12.3140	11.6659	11.0519	10.4703	9.9192	9.3971
40	15.9297	15.0913	14.2970	13.5446	12.8317	12.1563	11.5165	10.9104	10.3362	9.7922
45	16.4201	15.5559	14.7372	13.9615	13.2267	12.5306	11.8711	11.2463	10.6544	10.0936
50	16.7944	15.9104	15.0731	14.2797	13.5282	12.8162	12.1416	11.5026	10.8972	10.3237

Notes: <1> Data Based on Assumed DOS of Apr 1994.
             Authorized Period of Use of Table is Oct 1993 through Sep 1994.
         <2> Tabulated Data Based on Criteria Contained in 18 Mar 91 Tri-Service Memorandum
             of Agreement on Criteria/Standards for EA/LCC for MILCON Design
             (Discount rate = 4.0% for total study periods of 10 years or less;
             discount rate = 4.5% for total study periods greater than 10 years.)
         <3> Covers Costs such as Routine Maintenance & Repair and Custodial.

Table NE-2-7. Present Worth Factors--Annually Recurring Costs,
Non-Zero Differential Escalation (e = 1%)

Number of Payments	Beneficial Occupancy Date									
	Oct 1994	Oct 1995	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003
1	0.9712	0.9431	0.9159	0.8895	0.8639	0.8389	0.8147	0.7912	0.7684	0.7113
2	1.9143	1.8591	1.8054	1.7534	1.7028	1.6537	1.6060	1.5596	1.4472	1.3988
3	2.8302	2.7486	2.6693	2.5923	2.5175	2.4449	2.3744	2.2087	2.1347	2.0632
4	3.7197	3.6124	3.5082	3.4070	3.3088	3.2133	2.9965	2.8962	2.7992	2.7054
5	4.5836	4.4514	4.3230	4.1983	4.0772	3.8117	3.6840	3.5606	3.4414	3.3261
6	5.4225	5.2661	5.1142	4.9667	4.6550	4.4991	4.3484	4.2028	4.0620	3.9260
7	6.2373	6.0573	5.8826	5.5277	5.3425	5.1636	4.9906	4.8235	4.6619	4.5058
8	7.0285	6.8258	6.4305	6.2151	6.0070	5.8058	5.6113	5.4234	5.2417	5.0662
9	7.7969	7.3646	7.1180	6.8796	6.6492	6.4265	6.2112	6.0032	5.8021	5.6078
10	8.3312	8.0521	7.7824	7.5218	7.2698	7.0264	6.7910	6.5636	6.3437	6.1313
11	9.0186	8.7166	8.4246	8.1425	7.8697	7.6062	7.3514	7.1052	6.8672	6.6372
12	9.6831	9.3588	9.0453	8.7424	8.4495	8.1665	7.8930	7.6287	7.3732	7.1262
13	10.3253	9.9794	9.6452	9.3222	9.0099	8.7082	8.4165	8.1346	7.8622	7.5988
14	10.9460	10.5793	10.2250	9.8825	9.5515	9.2316	8.9224	8.6236	8.3348	8.0556
15	11.5458	11.1591	10.7854	10.4242	10.0750	9.7376	9.4114	9.0962	8.7916	8.4971
16	12.1257	11.7195	11.3270	10.9476	10.5810	10.2266	9.8841	9.5530	9.2331	8.9238
17	12.6860	12.2611	11.8505	11.4536	11.0700	10.6992	10.3409	9.9945	9.6598	9.3362
18	13.2277	12.7846	12.3564	11.9426	11.5426	11.1560	10.7823	10.4212	10.0722	9.7348
19	13.7511	13.2906	12.8454	12.4152	11.9994	11.5975	11.2091	10.8336	10.4708	10.1201
20	14.2571	13.7796	13.3180	12.8720	12.4409	12.0242	11.6215	11.2322	10.8560	10.4924
21	14.7461	14.2522	13.7748	13.3135	12.8676	12.4366	12.0201	11.6175	11.2284	10.8523
22	15.2187	14.7090	14.2163	13.7402	13.2800	12.8352	12.4053	11.9898	11.5883	11.2001
23	15.6755	15.1505	14.6430	14.1526	13.6786	13.2204	12.7777	12.3497	11.9361	11.5363
24	16.1170	15.5772	15.0554	14.5512	14.0638	13.5928	13.1375	12.6975	12.2722	11.8612
25	16.5437	15.9896	15.4540	14.9364	14.4362	13.9527	13.4854	13.0337	12.5972	12.1752
30	18.4722	17.8535	17.2555	16.6776	16.1190	15.5791	15.0573	14.5530	14.0656	13.5945
35	20.0986	19.4255	18.7748	18.1460	17.5383	16.9508	16.3831	15.8344	15.3041	14.7915
40	21.4703	20.7512	20.0562	19.3845	18.7352	18.1077	17.5013	16.9151	16.3486	15.8010
45	22.6272	21.8694	21.1369	20.4290	19.7448	19.0834	18.4443	17.8265	17.2295	16.6524
50	23.6029	22.8124	22.0484	21.3099	20.5962	19.9063	19.2396	18.5952	17.9724	17.3705

Notes: <1> Data Based on Assumed DOS of Apr 1994.
<2> Authorized Period of Use of Table is Oct 1993 through Sep 1994.
     Tabulated Data Based on Criteria Contained in 18 Mar 91 Tri-Service Memorandum
     of Agreement on Criteria/Standards for EA/LCC for MILCON Design
     (Discount rate = 4.0% for total study periods of 10 years or less;
     discount rate = 4.5% for total study periods greater than 10 years.)
<3> Covers Costs such as Routine Maintenance & Repair and Custodial.

Table NE-2-8. Present Worth Factors--Annually Recurring Costs,
Non-Zero Differential Escalation (e = 2%)

Number of Payments	Beneficial Occupancy Date									
	Oct 1994	Oct 1995	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003
1	0.9808	0.9619	0.9434	0.9253	0.9075	0.8900	0.8729	0.8561	0.8397	0.7849
2	1.9427	1.9053	1.8687	1.8327	1.7975	1.7629	1.7290	1.6958	1.5891	1.5511
3	2.8861	2.8306	2.7762	2.7228	2.6704	2.6190	2.5687	2.4130	2.3553	2.2989
4	3.8114	3.7381	3.6662	3.5957	3.5265	3.4587	3.2571	3.1792	3.1031	3.0289
5	4.7188	4.6281	4.5391	4.4518	4.3662	4.1219	4.0233	3.9270	3.8331	3.7414
6	5.6089	5.5010	5.3952	5.2914	5.0079	4.8880	4.7711	4.6570	4.5456	4.4368
7	6.4818	6.3571	6.2349	5.9155	5.7740	5.6359	5.5011	5.3695	5.2410	5.1156
8	7.3379	7.1968	6.8455	6.6817	6.5219	6.3658	6.2135	6.0649	5.9198	5.7782
9	8.1775	7.7982	7.6116	7.4295	7.2518	7.0783	6.9090	6.7437	6.5824	6.4249
10	8.7743	8.5644	8.3595	8.1595	7.9643	7.7738	7.5878	7.4063	7.2291	7.0561
11	9.5404	9.3122	9.0894	8.8720	8.6597	8.4526	8.2503	8.0530	7.8603	7.6723
12	10.2883	10.0421	9.8019	9.5674	9.3385	9.1151	8.8970	8.6842	8.4764	8.2737
13	11.0182	10.7546	10.4973	10.2462	10.0011	9.7618	9.5283	9.3003	9.0778	8.8607
14	11.7307	11.4501	11.1761	10.9088	10.6478	10.3931	10.1444	9.9017	9.6649	9.4336
15	12.4261	12.1289	11.8387	11.5555	11.2790	11.0092	10.7458	10.4887	10.2378	9.9929
16	13.1049	12.7914	12.4854	12.1867	11.8952	11.6106	11.3328	11.0617	10.7971	10.5388
17	13.7675	13.4381	13.1167	12.8029	12.4966	12.1976	11.9058	11.6210	11.3430	11.0716
18	14.4142	14.0694	13.7328	13.4043	13.0836	12.7706	12.4651	12.1668	11.8758	11.5917
19	15.0455	14.6855	14.3342	13.9913	13.6565	13.3298	13.0109	12.6997	12.3959	12.0993
20	15.6616	15.2869	14.9212	14.5642	14.2158	13.8757	13.5438	13.2197	12.9035	12.5948
21	16.2630	15.8739	15.4942	15.1235	14.7617	14.4085	14.0638	13.7274	13.3990	13.0784
22	16.8500	16.4469	16.0534	15.6694	15.2945	14.9286	14.5715	14.2229	13.8826	13.5505
23	17.4230	17.0061	16.5993	16.2022	15.8146	15.4362	15.0669	14.7065	14.3547	14.0113
24	17.9822	17.5520	17.1321	16.7223	16.3222	15.9317	15.5506	15.1786	14.8154	14.4610
25	18.5281	18.0848	17.6522	17.2299	16.8177	16.4154	16.0226	15.6393	15.2652	14.9000
30	21.0677	20.5637	20.0718	19.5916	19.1229	18.6654	18.2189	17.7830	17.3576	16.9423
35	23.3178	22.7600	22.2155	21.6840	21.1652	20.6589	20.1647	19.6823	19.2114	18.7518
40	25.3113	24.7057	24.1147	23.5378	22.9747	22.4251	21.8886	21.3649	20.8538	20.3549
45	27.0774	26.4297	25.7974	25.1802	24.5778	23.9898	23.4159	22.8557	22.3089	21.7752
50	28.6422	27.9570	27.2882	26.6353	25.9981	25.3762	24.7691	24.1765	23.5981	23.0336

Notes: <1> Data Based on Assumed DOS of Apr 1994.
Authorized Period of Use of Table is Oct 1993 through Sep 1994.
<2> Tabulated Data Based on Criteria Contained in 18 Mar 91 Tri-Service Memorandum of Agreement on Criteria/Standards for EA/LCC for MILCON Design (Discount rate = 4.0% for total study periods of 10 years or less; discount rate = 4.5% for total study periods greater than 10 years.)
<3> Covers Costs such as Routine Maintenance & Repair and Custodial.

Table NE-2-9.   Present Worth Factors--Annually Recurring Costs,
Non-Zero Differential Escalation (e = 3%)

Number of Payments	Beneficial Occupancy Date									
	Oct 1994	Oct 1995	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003
1	0.9904	0.9809	0.9714	0.9621	0.9528	0.9437	0.9346	0.9256	0.9167	0.8654
2	1.9712	1.9523	1.9335	1.9149	1.8965	1.8783	1.8602	1.8423	1.7434	1.7183
3	2.9427	2.9144	2.8864	2.8586	2.8311	2.8039	2.7769	2.6341	2.5963	2.5591
4	3.9048	3.8672	3.8300	3.7932	3.7567	3.7206	3.5379	3.4871	3.4371	3.3877
5	4.8576	4.8109	4.7646	4.7188	4.6735	4.4548	4.3909	4.3278	4.2657	4.2045
6	5.8013	5.7455	5.6903	5.6355	5.3851	5.3078	5.2316	5.1565	5.0825	5.0095
7	6.7359	6.6711	6.6070	6.3289	6.2380	6.1485	6.0602	5.9732	5.8875	5.8030
8	7.6615	7.5878	7.2864	7.1818	7.0780	6.9771	6.8770	6.7783	6.6810	6.5851
9	8.5782	8.2579	8.1394	8.0226	7.9074	7.7939	7.6820	7.5718	7.4631	7.3559
10	9.2436	9.1109	8.9801	8.8512	8.7242	8.5989	8.4755	8.3538	8.2339	8.1157
11	10.0965	9.9516	9.8088	9.6680	9.5292	9.3924	9.2576	9.1247	8.9937	8.8646
12	10.9372	10.7803	10.6255	10.4730	10.3227	10.1745	10.0284	9.8845	9.7426	9.6028
13	11.7659	11.5970	11.4305	11.2665	11.1048	10.9454	10.7882	10.6334	10.4808	10.3303
14	12.5827	12.4020	12.2240	12.0486	11.8756	11.7052	11.5371	11.3715	11.2083	11.0474
15	13.3877	13.1955	13.0061	12.8194	12.6354	12.4540	12.2753	12.0991	11.9254	11.7542
16	14.1812	13.9776	13.7770	13.5792	13.3843	13.1922	13.0028	12.8162	12.6322	12.4509
17	14.9633	14.7485	14.5368	14.3281	14.1224	13.9197	13.7199	13.5230	13.3289	13.1376
18	15.7341	15.5083	15.2857	15.0663	14.8500	14.6368	14.4267	14.2197	14.0155	13.8144
19	16.4939	16.2572	16.0238	15.7938	15.5671	15.3436	15.1234	14.9063	14.6924	14.4815
20	17.2428	16.9953	16.7514	16.5109	16.2739	16.0403	15.8101	15.5831	15.3594	15.1390
21	17.9809	17.7228	17.4685	17.2177	16.9706	16.7270	16.4869	16.2502	16.0170	15.7871
22	18.7085	18.4400	18.1753	17.9144	17.6572	17.4038	17.1540	16.9077	16.6650	16.4258
23	19.4256	19.1468	18.8719	18.6010	18.3340	18.0709	17.8115	17.5558	17.3038	17.0554
24	20.1324	19.8434	19.5586	19.2778	19.0011	18.7284	18.4596	18.1946	17.9334	17.6760
25	20.8291	20.5301	20.2354	19.9449	19.6586	19.3765	19.0983	18.8242	18.5540	18.2877
30	24.1652	23.8184	23.4765	23.1395	22.8073	22.4800	22.1573	21.8392	21.5258	21.2168
35	27.2687	26.8773	26.4915	26.1113	25.7365	25.3670	25.0029	24.6440	24.2903	23.9416
40	30.1558	29.7229	29.2963	28.8758	28.4613	28.0527	27.6501	27.2532	26.8620	26.4764
45	32.8415	32.3701	31.9055	31.4475	30.9961	30.5512	30.1126	29.6804	29.2544	28.8344
50	35.3399	34.8327	34.3327	33.8399	33.3541	32.8754	32.4035	31.9383	31.4799	31.0280

Notes: <1> Data Based on Assumed DOS of Apr 1994.
        <2> Authorized Period of Use of Table is Oct 1993 through Sep 1994.
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             of Agreement on Criteria/Standards for EA/LCC for MILCON Design
             (Discount rate = 4.0% for total study periods of 10 years or less;
             discount rate = 4.5% for total study periods greater than 10 years.)
        <3> Covers Costs such as Routine Maintenance & Repair and Custodial.

Table NE-2-10. Present Worth Factors--Annually Recurring Costs,
Non-Zero Differential Escalation (e = 4%)

Number of Payments	\<col\>									

Number of Payments	Oct 1994	Oct 1995	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003
					Beneficial Occupancy Date					
1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9532
2	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	1.9109	1.9018
3	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	2.8733	2.8595	2.8459
4	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	3.8403	3.8219	3.8036	3.7854
5	5.0000	5.0000	5.0000	5.0000	5.0000	4.8119	4.7889	4.7660	4.7432	4.7205
6	6.0000	6.0000	6.0000	6.0000	5.7882	5.7605	5.7329	5.7055	5.6782	5.6510
7	7.0000	7.0000	7.0000	6.7692	6.7368	6.7046	6.6725	6.6406	6.6088	6.5772
8	8.0000	8.0000	7.7549	7.7178	7.6809	7.6441	7.6076	7.5712	7.5349	7.4989
9	9.0000	8.7454	8.7035	8.6619	8.6204	8.5792	8.5381	8.4973	8.4566	8.4162
10	9.7406	9.6940	9.6476	9.6014	9.5555	9.5098	9.4643	9.4190	9.3739	9.3291
11	10.6892	10.6380	10.5871	10.5365	10.4861	10.4359	10.3860	10.3363	10.2868	10.2376
12	11.6333	11.5776	11.5222	11.4671	11.4122	11.3576	11.3033	11.2492	11.1954	11.1418
13	12.5728	12.5127	12.4528	12.3932	12.3339	12.2749	12.2162	12.1577	12.0995	12.0417
14	13.5079	13.4432	13.3789	13.3149	13.2512	13.1878	13.1247	13.0619	12.9994	12.9372
15	14.4385	14.3694	14.3006	14.2322	14.1641	14.0963	14.0289	13.9618	13.8950	13.8285
16	15.3646	15.2911	15.2179	15.1451	15.0726	15.0005	14.9287	14.8573	14.7862	14.7155
17	16.2863	16.2084	16.1308	16.0536	15.9768	15.9004	15.8243	15.7486	15.6732	15.5982
18	17.2036	17.1213	17.0393	16.9578	16.8767	16.7959	16.7156	16.6356	16.5560	16.4768
19	18.1165	18.0298	17.9435	17.8577	17.7722	17.6872	17.6026	17.5184	17.4345	17.3511
20	19.0250	18.9340	18.8434	18.7532	18.6635	18.5742	18.4853	18.3969	18.3089	18.2213
21	19.9292	19.8338	19.7390	19.6445	19.5505	19.4570	19.3639	19.2712	19.1790	19.0873
22	20.8291	20.7294	20.6302	20.5315	20.4333	20.3355	20.2382	20.1414	20.0450	19.9491
23	21.7246	21.6207	21.5172	21.4143	21.3118	21.2098	21.1084	21.0074	20.9068	20.8068
24	22.6159	22.5077	22.4000	22.2928	22.1861	22.0800	21.9743	21.8692	21.7646	21.6604
25	23.5029	23.3904	23.2785	23.1671	23.0563	22.9460	22.8362	22.7269	22.6182	22.5100
30	27.8747	27.7413	27.6086	27.4765	27.3450	27.2142	27.0839	26.9544	26.8254	26.6970
35	32.1428	31.9890	31.8360	31.6837	31.5321	31.3812	31.2310	31.0816	30.9329	30.7849
40	36.3099	36.1362	35.9633	35.7912	35.6199	35.4495	35.2799	35.1111	34.9431	34.7759
45	40.3782	40.1850	39.9927	39.8014	39.6109	39.4214	39.2328	39.0451	38.8582	38.6723
50	44.3501	44.1379	43.9267	43.7165	43.5074	43.2992	43.0920	42.8858	42.6806	42.4764

Notes: <1> Data Based on Assumed DOS of Apr 1994.
        Authorized Period of Use of Table is Oct 1993 through Sep 1994.
        <2> Tabulated Data Based on Criteria Contained in 18 Mar 91 Tri-Service Memorandum
        of Agreement on Criteria/Standards for EA/LCC for MILCON Design
        (Discount rate = 4.0% for total study periods of 10 years or less;
        discount rate = 4.5% for total study periods greater than 10 years.)
        <3> Covers Costs such as Routine Maintenance & Repair and Custodial.

Table NE-2-11. Present Worth Factors--Annually Recurring Costs, Non-Zero Differential Escalation (e = 5%)

Number of Payments	Beneficial Occupancy Date									
	Oct 1994	Oct 1995	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003
1	1.0096	1.0193	1.0291	1.0390	1.0490	1.0591	1.0693	1.0796	1.0899	1.0489
2	2.0289	2.0484	2.0681	2.0880	2.1081	2.1284	2.1488	2.1695	2.0928	2.1028
3	3.0581	3.0875	3.1172	3.1471	3.1774	3.2079	3.2388	3.1317	3.1467	3.1618
4	4.0971	4.1365	4.1763	4.2164	4.2570	4.2979	4.1657	4.1856	4.2056	4.2258
5	5.1461	5.1956	5.2455	5.2960	5.3469	5.1947	5.2196	5.2446	5.2697	5.2949
6	6.2052	6.2649	6.3251	6.3859	6.2189	6.2487	6.2785	6.3086	6.3388	6.3691
7	7.2745	7.3444	7.4150	7.2382	7.2728	7.3076	7.3426	7.3377	7.4130	7.4485
8	8.3540	8.4344	8.2526	8.2921	8.3318	8.3716	8.4117	8.4519	8.4924	8.5330
9	9.4440	9.2622	9.3065	9.3510	9.3958	9.4407	9.4859	9.5313	9.5769	9.6227
10	10.2670	10.3161	10.3655	10.4151	10.4649	10.5150	10.5653	10.6158	10.6666	10.7176
11	11.3209	11.3750	11.4295	11.4842	11.5391	11.5943	11.6498	11.7055	11.7615	11.8178
12	12.3798	12.4391	12.4986	12.5584	12.6185	12.6788	12.7395	12.8005	12.8617	12.9233
13	13.4439	13.5082	13.5728	13.6377	13.7030	13.7686	13.8344	13.9006	13.9671	14.0340
14	14.5130	14.5824	14.6522	14.7223	14.7927	14.8635	14.9346	15.0061	15.0779	15.1500
15	15.5872	15.6618	15.7367	15.8120	15.8877	15.9637	16.0401	16.1168	16.1939	16.2714
16	16.6665	16.7463	16.8264	16.9069	16.9878	17.0691	17.1508	17.2328	17.3153	17.3981
17	17.7511	17.8360	17.9214	18.0071	18.0933	18.1798	18.2668	18.3542	18.4420	18.5303
18	18.8408	18.9309	19.0215	19.1125	19.2040	19.2959	19.3882	19.4810	19.5742	19.6678
19	19.9357	20.0311	20.1270	20.2233	20.3200	20.4172	20.5149	20.6131	20.7117	20.8108
20	21.0359	21.1365	21.2377	21.3393	21.4414	21.5440	21.6471	21.7506	21.8547	21.9593
21	22.1413	22.2473	22.3537	22.4607	22.5681	22.6761	22.7846	22.8936	23.0032	23.1132
22	23.2521	23.3633	23.4751	23.5874	23.7003	23.8137	23.9276	24.0421	24.1571	24.2727
23	24.3681	24.4847	24.6018	24.7196	24.8378	24.9567	25.0761	25.1961	25.3166	25.4377
24	25.4895	25.6114	25.7340	25.8571	25.9808	26.1051	26.2300	26.3555	26.4816	26.6084
25	26.6162	26.7436	26.8715	27.0001	27.1293	27.2591	27.3895	27.5206	27.6522	27.7846
30	32.3313	32.4860	32.6415	32.7976	32.9546	33.1122	33.2707	33.4299	33.5898	33.7505
35	38.1845	38.3672	38.5507	38.7352	38.9205	39.1068	39.2939	39.4819	39.6708	39.8606
40	44.1790	44.3904	44.6028	44.8162	45.0306	45.2461	45.4625	45.6801	45.8986	46.1182
45	50.3183	50.5590	50.8010	51.0440	51.2882	51.5336	51.7802	52.0280	52.2769	52.5270
50	56.6059	56.8767	57.1489	57.4223	57.6970	57.9731	58.2505	58.5292	58.8092	59.0906

Notes: <1> Data Based on Assumed DOS of Apr 1994.

Authorized Period of Use of Table is Oct 1993 through Sep 1994.

<2> Tabulated Data Based on Criteria Contained in 18 Mar 91 Tri-Service Memorandum of Agreement on Criteria/Standards for EA/LCC for MILCON Design (Discount rate = 4.0% for total study periods of 10 years or less; discount rate = 4.5% for total study periods greater than 10 years.)

<3> Covers Costs such as Routine Maintenance & Repair and Custodial.

MEMORANDUM OF AGREEMENT
ON
CRITERIA/STANDARDS FOR ECONOMIC ANALYSES/LIFE CYCLE COSTING FOR MILCON DESIGN

1. <u>Purpose.</u> The purpose of this Memorandum of Agreement (MOA) is to establish criteria and standards for performing economic analyses and life cycle cost studies used in support of design decisions for projects in the Military Construction (MILCON) Program, i.e., to support the selection from various alternatives of components/systems being considered as elements in facilities design. These criteria and standards apply to all design decisions regardless of when they are made in the planning, programming, design, and procurement process. This agreement does not apply to economic analyses and life cycle studies used to make project-justification decisions during the planning and programming process.

2. <u>General.</u> Economic analyses shall be conducted as part of the design process to ensure that the selection/rejection of design alternatives is not based solely on construction costs, but also on least life cycle costs (LCC), that is, lowest total cost of ownership. The depth and degree of formality of these analyses shall be determined on a case-by-case basis to ensure that the cost of performing an analysis is clearly outweighed by the potential benefits derived. Results of generic studies or results of previous analyses of alternatives similar to those currently under consideration may be used in lieu of performing a new study provided the previous study was based on similar design conditions, criteria, and methods. Previous studies should be updated only as required to reflect changes of conditions significant enough to impact the design decision. All economic analyses and other justification for the selection of a design alternative, whether a previous study or a new one, shall be clearly documented in the appropriate section of the project design analysis.

3. <u>Methods.</u> All analyses shall consider the total LCC for design alternatives, where the LCC includes all costs and benefits associated with an alternative over its expected life, including but not limited to construction/procurement, energy, maintenance, operation, repair, replacement, alteration, disposal costs, and retention values. The present value discounting approach shall be used to adjust for the differences in timing of costs and benefits unless otherwise specified by other directives or by public law. The basic discount factor for finding the present value of a future amount is calculated as follows:

$$\text{Discount Factor} = \frac{1}{(1 + d)^n}$$

> where: d = appropriate discount rate, and
> n = the time period over which the discounting is done.

Discounting should be applied to all costs and benefits over the appropriate analysis period. Specific criteria are as follows:

   a. <u>Discount Rates.</u> The discount rates are expressed in "real" terms, i.e., over-and-above the rate of inflation for the economy as a whole.

   (1) <u>Non-energy related studies:</u> An annual "real" discount rate of 10% should be used in evaluating all non-energy related economic studies.

(2) Energy related studies: All energy related economic studies (studies in which energy costs are relevant, regardless of their magnitude relative to other costs) shall use the current discount rate published by the National Institute of Standards and Technology (NIST) in their annual supplement to NIST Handbook 135, and disseminated by the appropriate Service Headquarters Office.

b. Analysis Period: The analysis period shall be the date of the study (DOS) through the economic life of the facility as a whole. The economic life shall not be taken beyond 25 years from the scheduled beneficial occupancy date (BOD) for the project unless specifically approved by the appropriate Service Headquarters Office. Such approval cannot be granted for energy related studies as it is precluded by statute.

c. Cash Flow: In general, cash flow used in the analysis will be based on the estimated calendar dates on which the events and costs/benefits are projected/scheduled to occur. Construction/procurement costs may be assumed to be incurred as a single lump sum, preferably at the time corresponding to the midpoint of the construction/procurement process. Other cash flows that occur periodically throughout the year (e.g., cost of fuel, electricity, water, maintenance, etc.) may be assumed to be incurred as a single lump sum, preferably at midyear. In circumstances where the above assumptions add unnecessarily to the complexity of the calculations, all cash flows may be assumed to occur at the end of the year in which they are actually scheduled/projected to occur.
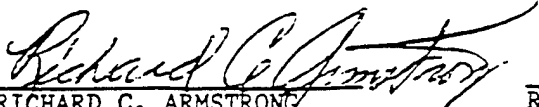
d. Benefits and Costs: All benefits and costs will be expressed in terms of constant dollars that reflect the purchasing power of the dollar on the DOS (i.e., constant DOS dollars). The rate of inflation of the economy as a whole will be excluded from all LCC calculations. (The rate of inflation is irrelevant to the LCC analysis results since all benefits and costs are expressed in terms of constant DOS dollars and discounted using a "real" discount rate which reflects the time value of money over-and-above the general rate of inflation.)
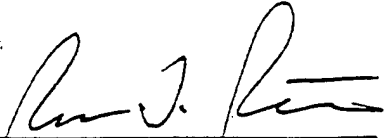
e. Future Benefits and Costs: In projecting future benefits and costs, an allowance for future price-level changes will be made only for particular benefits and costs expected to change at rates higher or lower than the general rate of inflation. In such cases, the rates of change used in the analysis will be the "differential" rates, i.e., the anticipated differences between the actual projected rates of change and the general inflation rate.
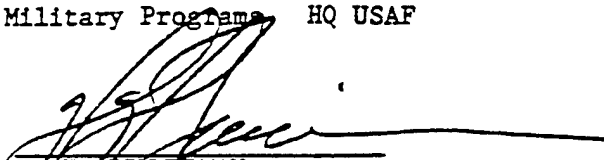
(1) Non-energy studies: For non-energy studies, the differential rate of future price-level change shall generally be assumed to be zero, except in those cases where there is reliable information/data to the contrary.

(2) Energy studies: Fuel/energy costs shall have differential escalation rates as published by NIST in Handbook 135 and disseminated as indicated in paragraph 3.a(2) above. All non-energy costs shall have a zero differential escalation rate.

4. Computer Aided Calculations. All computer aided calculations for MILCON design economic studies will be accomplished using the Life Cycle Cost In Design (LCCID), a computer program for economic analysis developed by the U.S. Army Corps of Engineers Construction Engineering Research Laboratory (CERL) or a version thereof which has been certified by CERL as equivalent.

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